DOCUMENT RESUME

ED 206 203	FL 012 516

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TITLE	Long Term Effects of Bilingual Education. Short and Long Term Gains in Spanish and English and in Academic Subjects in a Bilingual Program; Plus a Follow-up Study on Children One to Five Years Later. Final Evaluation, 1979-80 Program Year.
INSTITUTION	Pasco School District 1, Wash.
PUB DATE	Jan 81
NOTE	130p.; Funded by a variety of sponsors.
AVAILABLE FROM	Bilingual Mini Schools, S.W. 615 Cityview, Pullman, WA 99163 ($8.00).
EDRS PRICE	MF01/PC06 Plus Postage.
DESCRIPTORS	Bilingual Education; *Comparative Analysis; English (Second Language); *Individualized Instruction; *Instructional Innovation; *Mexican Americans; *Migrant Programs; Primary Education; *Program Evaluation; Second Language Instruction; Spanish; Validated Programs
IDENTIFIERS	*Bilingual Programs; Individualized Bilingual Instruction Program; National Diffusion Network Programs

ABSTRACT

This evaluation report is of a pre-school and primary grades bilingual program that was begun in 1971 as a demonstration model uniquely designed to meet the needs of children in migrant farm worker families. In order to overcome some of the disadvantages migrant children face due to frequent moves, parallel educational programs were set up in Washington state and in a border community in Texas, which was the home base for many of the migrants coming into Washington. Distinctive features of the program were the use of bilingual persons from the migrant community as teachers and the flexibility of the program in that it allowed for small group and individual instruction. The report covers the following: (1) program description; (2) evaluation of instructional components (preschool concepts, handwriting, Spanish and English vocabulary development, mathematics, English and Spanish reading, and cultural concepts); (3) special studies on improvement of oral language skills, and a comparison of effects of bilingual instruction in north and south Texas; (4) a follow-up study on upper grade level performance of children who have finished the special bilingual program; and (5) evaluations of staff development, parent/community involvement, materials development, and dissemination. (AMH)

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ED206203

LONG TERM EFFECTS OF BILINGUAL EDUCATION

SHORT AND LONG TERM GAINS IN SPANISH AND ENGLISH AND IN ACADEMIC SUBJECTS IN A BILINGUAL PROGRAM; PLUS A FOLLOW-UP STUDY ON CHILDREN ONE TO FIVE YEARS LATER

FL 012 516

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Published, Pullman, WA
January, 1981

INDIVIDUALIZED BILINGUAL INSTRUCTION

FINAL EVALUATION

1979-80 Program Year

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A NATIONALLY VALIDATED BILINGUAL PROGRAM

A DEMONSTRATOR/DEVELOPER PROGRAM IN THE NATIONAL DIFFUSION NETWORK

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PROGRAM DESCRIPTION

Started in 1971 as a Research and Demonstration Program

In 1971, the office of the President sent a request to all federal agencies asking them to make "migrants" a priority for services. The Division of Bilingual Education therefore sent out a request for proposals (RFP) to educational agencies inviting them to submit proposals for the development of a research and demonstration model uniquely designed to meet the needs of bilingual children in migrant farm worker families. This program was funded in response to this RFP based on the proposal submitted by Intermediate School District 104 of Ephrata, Washington (a district providing services to schools which has since been legally dissolved).

Rationale for an Interstate Program Model

One of the key features of the model was to be the attempt to overcome some of the disadvantages faced by the migrant child from the discontinuity in his education caused by frequent moves. Parallel educational programs were therefore set up in Washington State and in Texas in a border community which was the home base for many of the migrants coming into Washington.

In addition to the parallel year-round programs, the program had a mobile component in which teachers from the Texas site moved north with clusters of families, continuing the bilingual educational program as a supplement to the schooling they received in northern schools in a series of temporary work locations.

Because this program operates on an interdistrict basis in Washington State and an interstate basis in Texas and at each of the temporary mobile sites, it had to be designed as a supplemental program to whatever schooling was provided by the local school district in each area. For the preschool age children at each site, the program offers a day care program with the bilingual curriculum as its educational component. For school-age children a cooperative arrangement is worked out with the local school. If the kindergarten is half day the children attend the bilingual preschool in the other half day. For children up through third grade who are in school a full day, the bilingual program is provided either on a released time basis or after school, for an hour to an hour and a half each day.

Administration

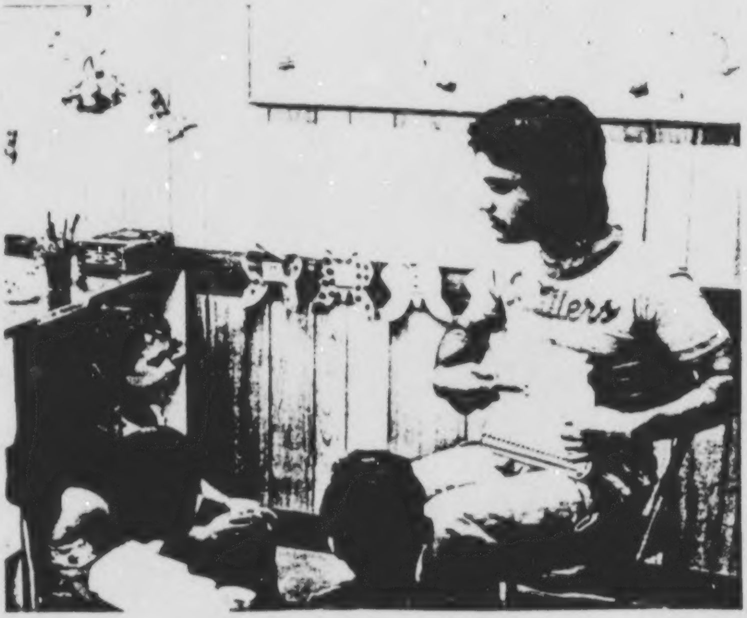
The program has its administrative office in Pasco, Washington, with a second administrative office in Grulla, Texas (the home base site for the Texas program, and origin of the children served in the mobile component which follows children when they move). The Texas administrative and training staff relocate to the north for a period of time every year to provide supervision to the mobile component. The funding for the program is from a combination of grants, and the funding agency for the program has changed five times in its nine years of program operation; however, the administrative staff and operation of the program have been basically the same throughout. At present, grant funds go through Pasco School District No. 1 in Washington State--the program operates there and elsewhere as described subsequently.

Rationale for Staffing with Migrant Adults

Because of the basic concept of this program--to provide continuity to children who moved about--the teaching staff for the program is entirely adults from the target population (more than half are parents of children served).

Efforts to establish educational programs that moved "in the migrant stream" had been made before this program was started. These earlier programs had tried to staff with certified personnel, and this was almost entirely unsuccessful. There is a shortage of bilingual certified teachers. The job conditions in such a mobile program are unattractive--few people want to move several times a year, living in temporary housing in remote rural areas, if there is an alternative. With "bonus pay" some are willing to do it for a short time. Some with a "peace corps" set of values are interested in doing it. However, even these dedicated teachers are hard to use because of the problem of housing in the northern areas. Almost all available housing is reserved for the farm workers. The IBI program overcame this housing problem by utilizing as teachers other adults from families who were already housed because some of the family members work in the fields.

The adults in the migrant families make a sacrifice in order to teach in this program since, for the limited period of time it is available, farm work pays better than the teaching salaries they receive. But the teaching positions offered year round pay, which offset the loss of the higher income they could have made with the seasonal work. The teaching adults recruited brought a special understanding and commitment to the job from first-hand knowledge of the difficulty of obtaining an education for a child moving in the migrant stream.



Parents serve on the screening committee that selects the teachers in the IBI program. About half the teachers have children in the program. Most were migrant workers before being hired to work in the IBI program.

For these reasons, it was decided to staff this program with teachers from the migrant families, and the choice of curriculum materials and the development of training techniques all had to meet one basic criterion: will this be effective when used by previously untrained and inexperienced bilingual adults recruited from the target population.

There was a precedent for use of a paraprofessional staff in an educational model introduced by Keller in the 1960's known as PSI or Personalized System of Instruction. This type of program was first used at the college level (but has since been adapted for use with students of all ages). Keller started using it in Brazil where he found that students in his classes (which were taught in English) could understand some English, but not well enough to follow lectures and to effectively pick up the biological sciences information he was teaching. He therefore worked out written materials and exercises in carefully sequenced lessons, and students studied these individually at their own pace, and were assisted and given feedback by student tutors--who spoke Portuguese as well as English. Using student tutors, one teacher was able to supervise large numbers of students, overseeing their general progress, being responsible for the development of the lesson material, and assisting the work of the student tutors.

The IBI program offers a parallel to this system. IBI hires professional teachers who are called "trainers" and each supervises from six to ten of the migrant adult teachers (called trainees), who in turn work with from 60 to 100 children. The migrant teachers are able to communicate well with the children, and their lack of schooling and experience is not a handicap because they do not have to invent the lesson materials. Each curriculum track is carefully prepared with well sequenced lessons, exercises, workbooks--some of which are programmed with an answer column so children can correct their own work. The training which is given to the migrant adult teachers is in how to model lessons, how to give feedback, encouragement, and in general how to use the individualized curriculum materials.

The problem of having to move staff obviously did not apply to the operation of the year-round sites. However, it was decided to have one basic program model and to use adults from the target population as teaching staff in these areas as well. Since there is a real shortage of available bilingual certified teachers in all three locations, this decision fit existing circumstances. The few certified personnel that could be hired were stretched by virtue of having them oversee a number of paraprofessional teachers, and under them quite a few more bilingual children than could have been taught directly by the bilingual certified teachers.

Description of the Communities in Which the Program Operates

Year-round programs are operated at Connell and at Moses Lake in Washington State, and in La Grulla, Texas. The Washington State sites are in the "Columbia Basin Area" which was reclaimed from desert by the Columbia Basin irrigation project and is now very fertile farming country. Almost all the settlement in the area is new, related to farming made possible by irrigation.

In Washington State sites, the Spanish speaking population makes up less than one-fifth of the local population. Nearly all of these originally came to the area to work in the crops. Many settled permanently in the area. Others came in on a seasonal basis. Spanish speaking families served by this program find a combination of employment in the fields and in food processing plants. Most of the families are able to obtain work intermittently for one or both parents that will last anywhere from three months to ten months in a year. For the families settled in the area, it is very common to take an extended vacation during the winter months when work is not available. Many travel to southern states, particularly Texas, and to Mexico during this time in order to see relatives, to take care of property, or to escape the northern cold and celebrate the holidays. It is very common for children to miss several weeks of school during this traveling period.

There is relatively little support for the maintenance of Spanish in the northern communities in Washington. Except for scattered Spanish language programming on radio and public TV all the media are in English. Access to the better paying jobs is dependent upon development of English skills. The public schools have great difficulty recruiting certified teachers who are bilingual or Mexican American, although the number of such teachers is increasing in the last three years.

La Grulla, home base for the Texas program, is a small town almost on the Rio Grande River in the tip of South Texas. La Grulla takes its name from a migrating bird, now extinct. Like the bird, the population of La Grulla almost all (over 80%) migrates north every year to do migrant farm work. During the winter the employment statistics a few years ago were 5% (e.g., 95% unemployed during the winter home base period, except for occasional field work lasting a few days). Nearly all of the income of the families in town therefore comes from the annual migration to the north.

There is a great deal of support for the maintenance of Spanish in La Grulla. All of the families are Spanish speaking, and Spanish is reinforced by the availability of TV channels received from Mexico. There are a number of radio stations that are entirely in Spanish. Church services are in Spanish. Spanish is used in the few public services available in the town (a few tiny grocery stores, a pool hall, and a gas station). Although English is the primary language of instruction in the school, and many of the public school teachers are not Mexican American and do not live in La Grulla but drive in from a neighboring community, most are able to speak at least some Spanish and the language that would be heard among children in the halls or on the playground at the school is almost exclusively Spanish.

When the families migrate to the north, they usually have housing provided by the growers for whom they work. Most live in camps, housed in trailers occupied by other Spanish speaking occupants so the temporary northern community resembles the home base community. However, most communication in the stores, medical services, schools, and other out of camp contacts in the northern communities will require the use of English.

Description of Children Served

Over 95% of the children served in the IBI program at each of the sites have one or both parents who are Mexican American or Mexican. The program enrolls preschool children as young as three and school-age children up to third grade. Most of the children begin the IBI program while they are of preschool age, but some children do begin the program after they have reached school age.

Carefully modeling new sounds to three year old children who have heard only Spanish at home, this teacher is using the beginning English oral language curriculum developed by IBI.

Table 1 provides a breakdown of the language classification of children who have been served in the IBI program. Because IBI has a preschool program, the majority of children entering the program have had relatively little exposure to language other than that used in the home. As shown in Figure 1, 50% of the children enroll in the program monolingual in Spanish (operationally defined as a vocabulary test score in English so low it is within the range that could be achieved simply by guessing). Nearly all of the children classified as primary language English are enrolled in the northern sites. These Mexican American children are mostly from homes in the process of language shift. The children hear more English than Spanish but may hear a very poorly developed English; their test scores in English are therefore very low if compared to the native English speakers from the dominant ethnic groups.

Table 1. Language Classification of CBI Children Based on Comparative Vocabulary Pretests in Spanish and English

TOTAL CHILDREN SERVED: SERVED: 897	Primary Language Spanish: 697 (78%)	Monolingual Spanish: 449 (50%)*
		Bilingual Spanish Dominant: 248 (28%)*
	Primary Language English: 200 (22%)	Bilingual English Dominant: 70 (8%)
		Monolingual English: 130 (14%)

LANGUAGE CLASSIFICATION BY NORTH/SOUTH SITES

NORTH	SOUTH
Monolingual Spanish: 154 (17%)	Monolingual Spanish: 295 (33%)
Bilingual Spanish Dominant: 119 (13%)	Bilingual Spanish Dominant: 129 (14%)
Bilingual English Dominant: 62 (7%)	Bilingual English Dominant: 8 (1%)
English Monolingual: 126 (14%)	English Monolingual: 4 (-%)

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*Operational Definitions:

Monolingual = Score on second language vocabulary test 9 or below, considered to be within a range that could be achieved just by guessing.

Bilingual = Score on second language vocabulary 10 or above, beyond a guessing range.

TOTAL CHILDREN SERVED IS CUMULATIVE 1971 THROUGH SEPT., 1980

Over 90% of the children qualify for free lunch using the USDA poverty guidelines. The parents do seasonal farm work--sometimes in the fields, and sometimes in processing plants. The parents are in most cases U.S. citizens and the children are nearly all American born.

Curriculum

Because IBI has a relatively short period of instruction time available with the school-age children, it concentrates on teaching language skills and the basic academic subjects of reading and math. The preschool children, who are available for a longer day also receive instruction in handwriting, and activities aimed at development of certain preschool concepts and pre-academic skills. All children also have some activities designed to develop multicultural understanding.

The handwriting, math and reading curriculum all have individual workbooks or practice sheets so children can work at their own pace. Teachers supervise from six to ten children at a time, moving from one to another explaining concepts and checking work.

All curriculum materials used by IBI can be individualized or taught in small groups. Each has the sequencing built in so that the teacher does not need to have the knowledge on how to develop concepts from simple to more complex. Most of the materials are carefully programmed, so that even review is built in meaning that children retain what they have learned and add to it. The IBI model attempts to provide continuity not only in a geographic sense, but from year to year, and preschool to school. Each academic area has a continuous track curriculum from preschool through third grade. IBI has developed mastery tests keyed to the curriculum materials used, which help in placement of the child, and also help in planning remediation if the child forgets something during a move.

Most of the curriculum materials are relatively self-contained, using a teacher presentation book or child workbooks, or consumable worksheets such as in handwriting. IBI avoided materials which had to have a lot of teacher preparation, because many IBI teachers handle two or three groups a day, each for a limited release time period, and cannot spend extensive time in preparation. The use of one set of materials for teaching of reading, or of math, goes contrary to current trends which are to use management systems and to index a wide variety of curriculum resources. A program that moved obviously could not carry a "resource room" with it. However, even in the year-round sites, it was decided to limit the curriculum materials to one series because it was found that the most effective teacher training was that which was most specific to the curriculum used--that limiting the curriculum to a manageable set meant teachers could be trained to use it effectively in a relatively short time.

Language of Instruction

All teachers are bilingual. They use both languages in teaching, switching freely from one to another with individual children in their group depending on what the child seems to understand. Children of mixed language capacity will be assigned in the same group, so that children who initially do not use much English or much Spanish themselves hear the other language used with other children. This develops their auditory comprehension of both languages from classroom communication. In addition to learning languages from usage in the classroom, both Spanish and English are systematically taught using a structured oral language program (described more fully in the evaluation where language gains are reported).

All teachers are bilingual and use both languages throughout the day. The teachers are trained to make many contacts with each child during each lesson period, so no child can remain silent letting some more vocal child do all the talking.

It has not been the policy to establish any period during the day in which use of one or ther other language is "restricted" to force children to learn the language of choice. Project staff were aware of the arguments for language separation, and alternative systems such as alternating day use. However, with the irregular attendance patterns of migrant children, this did not seem practical. The program also found it impractical to strive for a gradually changing percentage allocation of time to one language or the other because new children enroll in the program virtually every week throughout the year. At any one time the children enrolled would represent vast differences in the period of prior attendance as well as language capability, making it impossible to arrive at a reasonable basis for allocating language use that could be applied across the entire program or even small instruction groups.

The project teaches reading in both English and Spanish. In the IBI program, English reading is started first, and Spanish reading is introduced after a given level of proficiency is reached in English in order to avoid confusion over phonetic differences during the period when the child is first learning decoding skills.

This sequencing of reading instruction is contrary to established practice. The explanation is that, when reading was added to the IBI curriculum, the project decided to develop its own primer to provide beginning reading skills that would lead into the programmed Spanish reading curriculum. It took time to develop and field test these curriculum materials. In the meantime, the English reading curriculum was started since the curriculum materials were readily available.

Once the IBI staff had developed the Spanish reading curriculum the question came about whether the sequence should be changed. In general, parents were in favor of keeping the instruction in English first and introducing Spanish reading later. Doing so they felt helped the children who moved from Texas to schools in the north where children had been learning reading in English from the start of first grade. Parents were pleased that IBI children were able to keep up, and were afraid that delaying the start of English reading instruction would be harmful to those children who migrated north to schools where reading was taught only in English. When the Spanish reading was introduced, children had already learned basic reading skills and therefore they learned Spanish reading very quickly and caught up to children who were learning both in the Texas school system.

It should be noted that starting in the fall of 1980, with the consent of the parents, some children are now starting reading in Spanish. In three years, following their progress, the project should have some useful data on which sequencing is most useful with this target population.

Classroom Organization

The preschool centers operated at the year-round sites have academic work areas where children work at small tables with the teacher moving around them, or where the children sit around the teacher for a lesson involving a teacher presentation book. The rest of the space is divided between open area for larger group activities and interest centers, common to most preschools. The school age program uses similar work areas, and they have a corner or bookshelf to keep activities and materials to be used during independent choice periods.

The daily schedule has academic periods in which the teacher organizes and manages the learning time. It also has child choice periods in which the child selects and organizes use of his time. The choice periods are used as a reinforcer for the shaping of academic behavior--access to the materials and activities is contingent upon completion of "contracts" for the academic materials, or in token exchange for tokens earned during the academic period in some subjects. In disseminating the program, IBI has taken the position that use of tokens or contracting system is optional to the adopting district, but that use of the positive reinforcement teaching methods is essential, whether or not it is backed up by time management or tangible reinforcers. IBI has appropriate training instruments for any of these options, and all have been field tested at IBI sites.

Teacher Selection and Training

An earlier section in this program description explained the project's rationale for using only migrant adult paraprofessionals as teachers in the IBI program. At each site where the IBI program is operated, there is a parent/community advisory group. The committee consists of a number of parents plus the training and supervisory personnel for the local site. Although the school district has legal authority to finally approve all personnel it has in fact followed the recommendations of the local screening committee in all cases for the selection of paraprofessional teachers.

The professional trainer carries out continuous inservice training. This teacher and trainer are going over notes made while the teacher was being observed with her group. There is a criterion of teaching behaviors that must be demonstrated to pass each training unit.

Both men and women were employed as teachers, although primarily women have applied. Preference was given for applicants who had completed high school or had a G.E.D., but at least one-third of the teachers employed by the program have had less than a high school education when first hired.

The proficiency of the applicant in the two languages is determined by oral interview, and sometimes by having the applicant do on the spot translation. Screening procedures for teacher applicants have tended to vary, but in all cases only informal measures were used to judge language facility.

For the 1979 evaluation, the evaluator asked teaching staff at each site to complete a self-rating form asking them to rate their ability to speak English and Spanish, and their ability to write English and Spanish on a 5-point scale. It also asked them to estimate the percentage of time they used Spanish at home.

The table below summarizes these results in terms of the comparison between the two languages, i.e., whether the teacher felt she/he spoke or wrote Spanish or English better or the same, and which language was used more in the home. Since there was a different pattern among teachers in the Washington State centers and the Texas-mobile centers, the results are separately reported.

TABLE 2: Comparative Ability of Teachers to Speak and Write English and Spanish, and Comparative Use of Spanish and English in the Home, of IBI Teachers in 1979

	Washington State Teachers			Texas-Mobile Teachers		
	Better in Spanish	Better in English	Same	Better in Spanish	Better in English	Same
Speak	15%	43%	43%	84%	0%	16%
Write	10%	52%	38%	29%	50%	21%
Language used most in home	38%	33%	29%	78%	0%	22%

The fact that most teachers in both Washington State and Texas felt they could write English better than Spanish reflects the fact most were educated in schools in which only English was taught--the exceptions, who felt they could write better in Spanish, had received all or part of their education in Mexico.

The differences in comparative ability to speak English and Spanish and the comparative use in the home reflects the different status of Spanish and English in the north and in the Texas border community.

The method for training teachers evolved by systematically trying different approaches for the first three years of project operation. The most effective training method was found to be inservice training in which skills taught were very specific to the curriculum to be used, in which teaching skills were demonstrated as well as explained by the training staff, and in which actual classroom observation and feedback was used to determine if teaching skills had been mastered. The project has developed a few general classroom management training units, and two or three units specific to each curriculum area. Each has a criterion for mastery based on recorded observation of actual classroom interaction.

Although this training method was developed around the needs of teachers who did not have previous teaching experience or academic background, IBI has about twenty other school districts which have adopted some aspects of the curriculum and related training. At these adoption sites a combination of certified staff and paraprofessionals have been trained, and the method seems to be as effective and as well received by the certified teachers as for the paraprofessional staff.

Every teacher in the IBI program takes part in a continuous program of in-service teacher training. However, teachers are assigned children from the first week of employment so the chilren's progress represents the effectiveness of teachers with varying amounts of training at any given time.

Evaluation Design

In order to judge whether children have benefited from the IBI program it was necessary to have some reasonable basis for judging how the children would have progressed academically without benefit of the program. To do this, IBI uses a variation of a "baseline" evaluation design, and for some tests it uses a local comparison group.

In a "baseline" evaluation design, test scores obtained from children in a period before a particular program was put in place are used as the "baseline" for comparison to the scores made by children of the same age or grade level who were tested some time after the new program was initiated. In its variation of the "baseline" approach, IBI pretests children when they first enter the IBI program. These initial scores are then accumulated into a data bank for each age level, which is subdivided according to the language dominance of the child tested. Because children enter the IBI program at different ages throughout the age range served by the program, over the years IBI has been able to accumulate enough scores at each age level to use as a comparison "baseline" for that age level. Children are then post-tested after differing periods of attendance in the IBI program. Their post-test scores are compared to the scores for that age level in the project's "baseline" bank of pretest scores.

Because the migrant children served by IBI attend irregularly and have many disruptions in their schooling, testing on fixed calendar dates would have been meaningless. Children tested on a given day would have had vastly different periods of program attendance up to the test date. In addition, on any given day many children who had been served during the year might be absent and would be missed. The project, therefore, keeps attendance individually on each child, and post-tests are given after the child has attended 100 days, and subsequently at

100 day attendance intervals. As different children reach these testing intervals at different times, some post-tests are given each month throughout the year. As some new children enroll each month, the pretests are also being given throughout the year, so that the time of testing tends to equalize out for the two groups.

When analysis is done for an evaluation, the tests are grouped by age level and attendance, and compared to the "baseline" of pretest scores, referred to in the evaluation as the "baseline comparison" of the same age. Although the post-tests were given at different times, each represents a known period of program attendance. And the pretests going into the baseline of scores called the "baseline comparison" represent actual scores obtained by project children thorugh whatever collection of educational experiences was available to them up to the time they entered the IBI program. As such, they represent a reasonable basis for judging how project children would have progressed academically without the IBI bilingual program.

Because fewer children enter the IBI program in the school-age years, it took longer to accumulate a baseline of pretests at the upper age ranges. However, the project had tested migrant school-age children in a neighboring community to La Grulla for a special study on the effects of mobility (see evaluation instructional goal nine). A statistical test was run comparing the distribution and means of scores of project children's pretests, and the test scores for migrant children in the neighboring school district, and no significant differences were found. On this basis, it was judged that the migrant children in the neighboring community represented the same basic population of chilren as those served by the IBI project, and these test scores were added to the data bank as part of the "baseline comparison" to increase the size of the this group for purposes of statistical analysis.

By giving a language test at the same time as the achievement tests, IBI separates test scores by the language dominance of the children and is able to do a separate analysis by language group for the academic skills in which language makes a significant difference in children's pretest scores. It was found that language dominance did make a difference in testing vocabulary and reading, so statistical analysis is done separately by dominance groups. It did not make a difference in testing math, handwriting or preschool concepts so long as the tests were administered in the child's primary language, so the analysis pools all the test scores for these subject areas.

This general description of the program has been included to provide the general reader with information on the type of educational program being evaluated, and the means that have been used to judge its effectiveness. Other details on the project evaluation design and methods of statistical analysis may be found in the Technical Appendix.

1980 EVALUATION OF PROGRESS: INSTRUCTIONAL COMPONENT

GOAL 1. CHILDREN THREE TO FIVE WILL LEARN PRESCHOOL CONCEPTS.

THE IBI CURRICULUM TO TEACH PRESCHOOL CONCEPTS: IBI combines concept and language learning using the DISTAR® Language Curriculum published in English by SRA, and published in Spanish by Bilingual Mini Schools (a non-profit corporation which developed the Spanish translation for the IBI program, and is now licensed by SRA to sell the Spanish edition to any schools that would like to use it).

This curriculum is taught to a small group of children from a teacher presentation book. The concept content includes such things as comparisons (the glass is full, the cup is empty); positional words (the paper is on the book, the dog is under the table); classification (a dog and a mouse are animals); etc. The 1976 edition has an "action track" in which children follow simple commands. Use of physical actions and use of real objects to supplement the picture presentation help add meaning, especially for younger children.

The IBI staff developed a "Pre-DISTAR" series of lessons for very young children (three and early four) in Spanish and English. These lessons require children to make pointing responses and oral responses that require only single words to two-word phrases. This is used as a transition into the published DISTAR® which requires children to use whole sentences in responding almost from the beginning lessons.

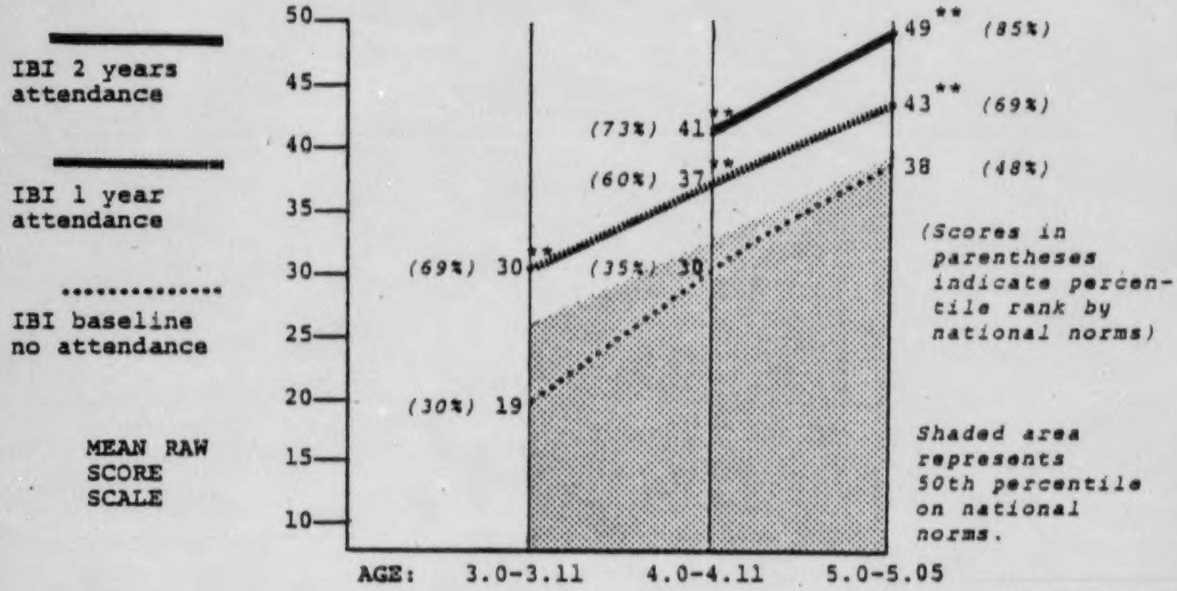
Lessons are given in each language to preschool children, at least 20 minutes a day in Spanish and another 20 minutes a day in English. In this way children learn the meaning of the concept in their primary language, and it is then reinforced as they learn the vocabulary in their second language. In addition to these lesson periods, two or three unstructured learning periods (child choice) take place each day, and concept learning activities using a variety of common preschool play materials take place in these periods.

PROJECT RESULTS: Children are tested on the Cooperative Preschool Inventory to measure their knowledge of preschool concepts. This is a nationally standardized test originally developed to measure the outcome of Head Start programs. It is published in Spanish and English, and project children are tested in their primary language. It measures concepts usually considered important as school readiness skills: the ability to understand and follow directions, size and number concepts, the recognition of colors and shapes, etc.

Figure 1 which follows presents the test scores of project children after differing periods of attendance in the IBI program. The baseline group represents pretests of children of different ages as they entered the IBI program. It therefore provides a reasonable basis for judging how children in this target group would have scored on this test without benefit of the program. As shown in Figure 1, at every age level this baseline group has scored below the national norms; at ages three and four the average score is at the 30th and 35th percentile which means that only 30, or 35% of children in the national sample had scores this low or lower. This represents a very low level of academic readiness, particularly since the national norms for this test were based not on the general school population but on the tests of children from the lower socioeconomic group considered to be educationally disadvantaged.

Each period of attendance in the IBI program is reflected in higher scores on this test, as shown in Figure 1 and Table 3 in the Technical Appendix. After a period equal to one school year, the average scores of children have risen to

SCORES ON COOPERATIVE PRESCHOOL INVENTORY



(Scores in parentheses indicate percentile rank by national norms)

Shaded area represents 50th percentile on national norms.

** $p < .01$ (i.e., the superiority of this score over the baseline groups of the same age with no project attendance is statistically significant.)

Detailed test score analysis is shown in Table 3 in the Technical Appendix.

FIGURE 1: MEAN RAW SCORES AND NATIONAL PERCENTILE RANKS ON COOPERATIVE PRESCHOOL INVENTORY BY AGE GROUP AND PERIOD OF ATTENDANCE IN THE IBI BILINGUAL PROGRAM.

TO SUMMARIZE THE FINDINGS IN FIGURE 1:

1. THE BASELINE GROUP HAS SCORES BELOW THE NATIONAL NORMS FOR THIS TEST, INDICATING THAT WITHOUT THE PROGRAM CHILDREN WOULD BE LOW IN THE READINESS SKILLS MEASURED BY THIS TEST.
2. CHILDREN WHO HAVE ATTENDED THE PROGRAM FOR ONE YEAR AVERAGE SCORES WELL ABOVE THE NATIONAL NORMS FOR THIS TEST.
3. CHILDREN WHO HAVE ATTENDED THE BILINGUAL PRESCHOOL FOR TWO YEARS HAVE AVERAGE SCORES THAT RANK THEM IN THE TOP THIRD BY NATIONAL NORMS AT AGE FOUR, IN THE TOP QUARTILE AT AGE FIVE.
4. THE SUPERIORITY OF CHILDREN WHO HAVE ATTENDED THE IBI BILINGUAL PROGRAM OVER THE BASELINE SCORES IS LARGE ENOUGH TO BE STATISTICALLY SIGNIFICANT, MEANING THAT THE POSSIBILITY THAT THIS MUCH DIFFERENCE IN SCORES WOULD OCCUR BY CHANCE IS LESS THAN ONE IN 100.

a level well above national norms. For five year olds, with two years preschool training in the IBI program, the average score is at the 85th percentile by national norms.

The superiority of children in the IBI bilingual program after even 1/2 year attendance (see Table 3) over the baseline group of comparable age is statistically significant beyond the .01 level, meaning that the possibility that this much difference would occur by chance rather than as a program effect is less than one in 100. The progressively higher scores for each additional period of attendance is further evidence of an educationally significant change brought about by participation in this bilingual preschool program.

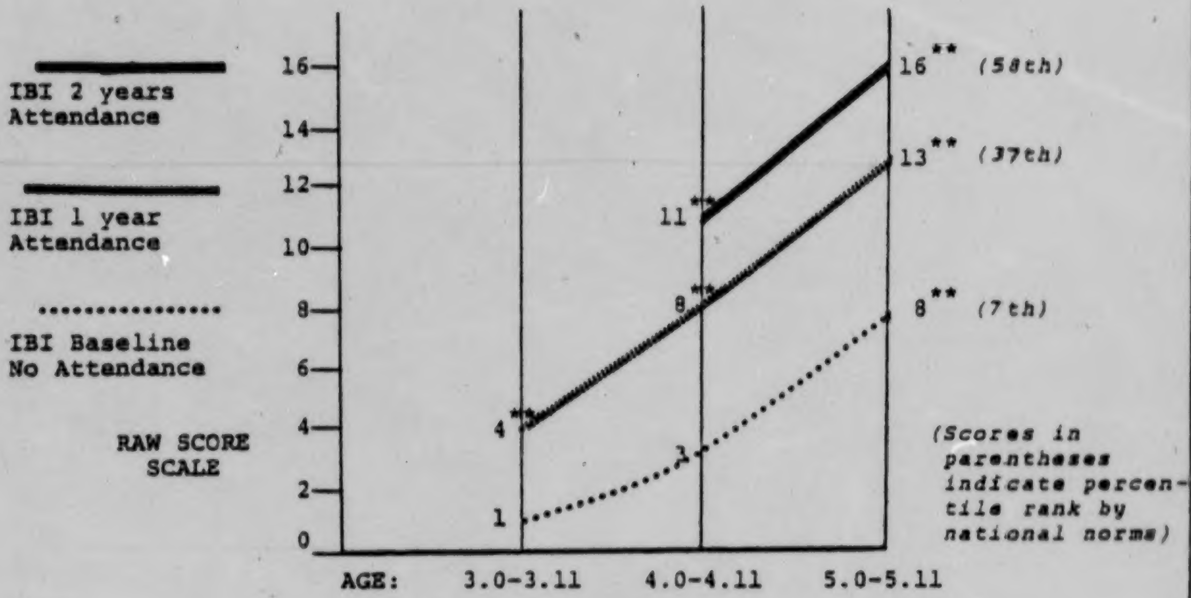
GOAL 2. PRESCHOOL CHILDREN LEARN HANDWRITING SKILLS.

THE IBI CURRICULUM TO TEACH HANDWRITING: IBI uses a series of 29 ditto masters published by the Follow Through Program at the University of Kansas. From these masters, practice handwriting sheets are duplicated by the project. With these the children work at their own pace, learning to follow left-to-right sequencing, going from the top to bottom rows on a page, and progressively develop greater coordination as the exercises become more difficult or the criteria used for acceptable performance is increased. After completion of the 29 "levels", as the beginning curriculum is called, the children go into workbooks from the Steck-Vaughn Co. of Austin, Texas which is called the Imaginary Line Handwriting Series. Lessons approximately 10 minutes in length are given daily to preschool children in the IBI program.

PROJECT RESULTS: Children are tested on the preschool "spelling" section of the Wide Range Achievement Test as a measure of the visual motor skills involved in handwriting. The test requires the child to copy 18 marks of increasing difficulty level, and to write two letters of his/her name.

Figure 2 which follows compares the baseline scores of children before any project attendance to the scores of project children of the same age who had attendance the equivalent of one or two school years in the individualized bilingual program. As the Figure indicates, children demonstrate increased handwriting skills the longer they participate in the program. As shown in Table 4 the improvement is enough to be statistically significant after even one-half year in the program. In this case the difference in scores after project participation is so great that the possibility that it could occur by chance is less than one in 1,000.

HANDWRITING SKILLS



***p < .001 (i.e., the superiority of this score over the baseline group of the same age with no project attendance is statistically significant.)*

Detailed test score analysis is shown in Table 4 in the Technical Appendix.

FIGURE 2: MEAN RAW SCORES AND NATIONAL PERCENTILE RANKS ON SPELLING SUBTEST OF WIDE RANGE ACHIEVEMENT TEST BY AGE GROUP AND PERIOD OF ATTENDANCE IN THE IBI PROGRAM.

TO SUMMARIZE THE FINDINGS IN FIGURE 2:

1. THE INDIVIDUALIZED HANDWRITING CURRICULUM USED BY IBI PRODUCES STEADY IMPROVEMENT IN CHILDREN'S SCORES THE LONGER THEY PARTICIPATE IN THE PROGRAM.
2. THE GAINS MADE BY CHILDREN RECEIVING THE HANDWRITING CURRICULUM ARE LARGE ENOUGH TO BE STATISTICALLY SIGNIFICANT AT EVERY AGE LEVEL.
3. BASED ON NATIONAL NORMS FOR THIS TEST (ONLY AVAILABLE FOR AGE FIVE), THE MIGRANT CHILDREN SERVED ENTER THE PROGRAM WITH A LOW LEVEL OF SKILL (7TH PERCENTILE). THOSE ATTENDING THE IBI PRESCHOOL FOR TWO YEARS BRING THEIR HANDWRITING SKILLS UP TO A LEVEL SOMEWHAT ABOVE NATIONAL NORMS (58TH PERCENTILE).

There are no national norms for children below the age of five. However, based on the norms for five year olds, children served by this program, who had participated in the IBI preschool program for two years had handwriting skills somewhat above the national norms (the 58th percentile, whereas the national average would be represented by the 50th percentile). Apparently the lack of opportunity to develop these skills in the children's home environment results in quite deficient development in this area, as five year olds who had not been previously served by the program scored at the 7th percentile (i.e., in the national sample only 7% of the children tested had scores this low or lower).

GOAL 3. CHILDREN WILL IMPROVE IN SPANISH.

THE IBI CURRICULUM TO TEACH SPANISH: IBI field tested the Spanish edition of DISTAR® Language I, translated for IBI by Bilingual Mini Schools, a private corporation which has a license to sell the Spanish edition granted by SRA. The project selected these materials because they are very well programmed; that is, each new skill is practiced many times and then re-used as new skills appear. All skills are cumulative; they never disappear from the material. And because it is well programmed the children do not make frequent errors.

Spanish DISTAR® is taught in a small group from a teacher presentation book which clearly outlines the dialogue used in teaching--a feature which is very helpful to a paraprofessional teacher. It involves a fast paced verbal exchange in which children would be expected to make from 150 to over 200 language responses during a 20-minute lesson period. Because the language responses require both phrases and whole sentences, the children learn to use the language with all its connecting words instead of learning an isolated vocabulary which often occurs with other language approaches.

The IBI program accepts very young children, age three and four, for whom a curriculum called "Pre-DISTAR" has been developed by the project. This curriculum begins with action responses and then requires one- or two-word responses. Children can use it who are not yet ready for whole sentence responses required in the regular DISTAR® series. Pre-DISTAR is in both Spanish and English.

Lesson periods in oral Spanish of approximately 20 minutes per day are given all children in the preschool program and up to first grade. (DISTAR® Level I is appropriate to the first grade level. Level II is not yet available, so the project is waiting to extend the oral language program to the older school age children.)

In addition to the lessons in oral Spanish, all staff are bilingual and use both Spanish and English in the teaching of other subjects and in informal conversation throughout the day.

PROJECT RESULTS: Children are tested for receptive vocabulary in Spanish using the Peabody Picture Vocabulary Test, Form B, administered in Spanish using a project translation.

Test results are reported separately by the child's primary language classification in Figure 3 which follows because there is a significant difference in the range of vocabulary scores related to the child's home language. As would be expected, these test results indicate that children whose primary language is Spanish have scores in Spanish much higher than those whose primary language is English, with or without the program. However, within each language group, the average scores of children receiving the IBI bilingual curriculum is higher in Spanish than the project norm group, who by and large had received no instruction in Spanish but picked up their Spanish from informal usage.

In noting that children in the IBI program improved in Spanish, it should also be noted that they have done this at the same time that they have greatly increased their knowledge of their second language, English. These findings are contradictory to the "balance effect" hypothesis proposed by Macnamara* in 1966 which proposed that the bilingual child paid for his/her acquisition of second language skills by a decrease in first language skills. These project results seem to indicate that language learning in Spanish and English is additive for the children involved in the IBI program.

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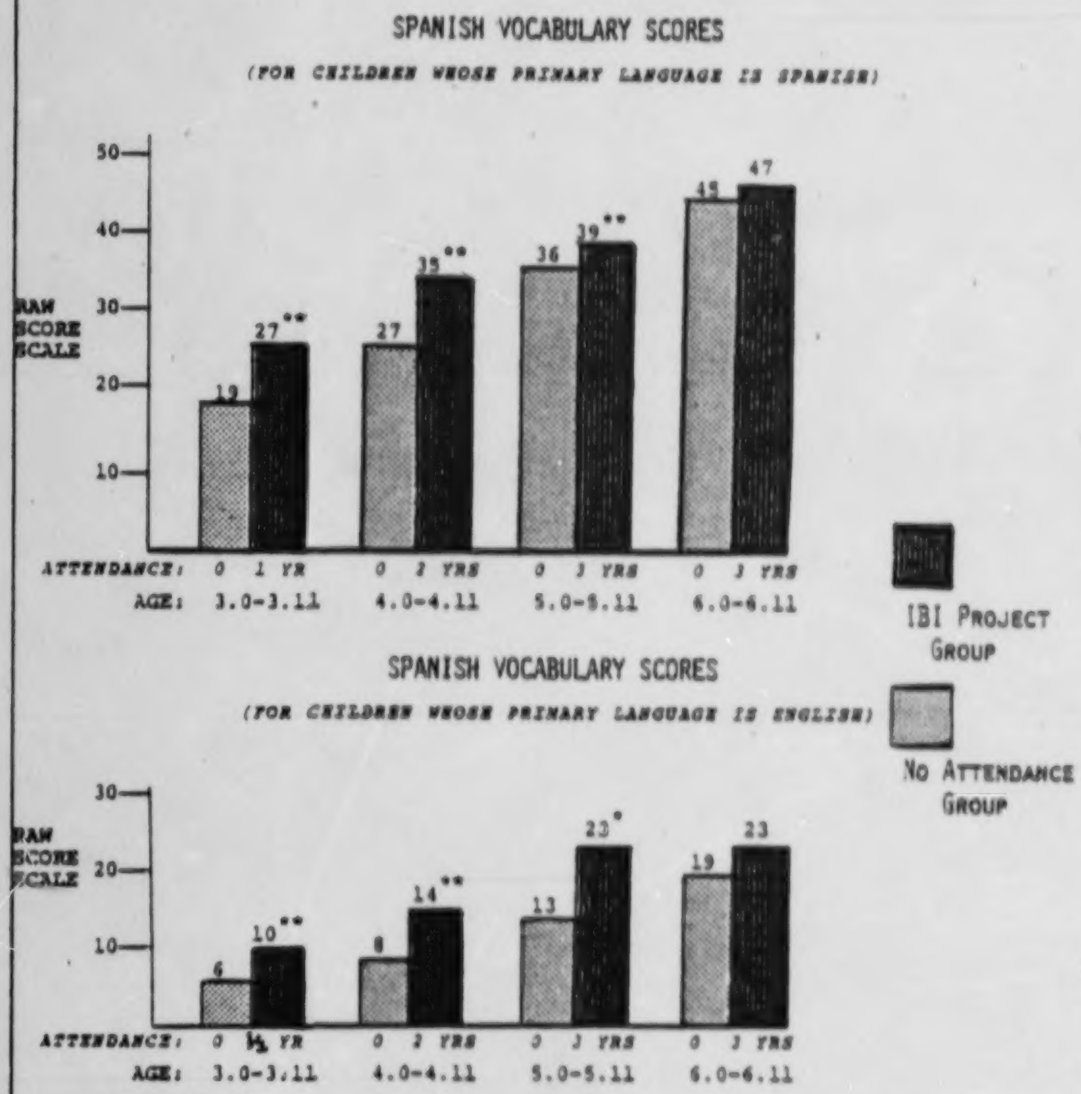
*John T. Macnamara, Bilingualism and Primary Education: A Study of Irish Experience (Edinburgh: Edinburgh University Press, 1966).



SPANISH VOCABULARY SCORES

(FOR CHILDREN WHOSE PRIMARY LANGUAGE IS SPANISH)

SPANISH VOCABULARY SCORES

(FOR CHILDREN WHOSE PRIMARY LANGUAGE IS ENGLISH)

*$p < .05$ **$p < .01$ (i.e., the difference between this score and the score of the no attendance group is enough to be statistically significant)

Detailed test score analysis is given in Table 5 in the Technical Appendix.

FIGURE 3: MEAN RAW SCORES IN SPANISH VOCABULARY ON IBI TRANSLATION OF FORM B OF THE PEABODY PICTURE VOCABULARY TEST BY PERIOD OF ATTENDANCE, AND PRIMARY LANGUAGE CLASSIFICATION.

TO SUMMARIZE THE FINDINGS IN FIGURE 3:

1. BOTH SPANISH AND ENGLISH DOMINANT CHILDREN SHOWED GAINS IN SPANISH UNDER THE IBI CURRICULUM.
2. COMPARED TO THE AVERAGE SCORES OF THE PROJECT NORM GROUP OF THE SAME PRIMARY LANGUAGE CLASSIFICATION, THE SUPERIORITY AT AGE THREE, FOUR, AND FIVE IS STATISTICALLY SIGNIFICANT.

Table 5 in the Technical Appendix gives the statistical detail of the Spanish vocabulary test scores. This indicates that the average scores generally increase the longer the child is in the program. For both Spanish and English dominant three and four year old children, the superiority of project children over the no attendance group is statistically significant after only one-half year attendance (i.e., 100 days), and continues to increase with additional periods of attendance. For five year old children, the superiority in Spanish of project children who entered as English dominant is statistically significant by two years attendance; for children who entered as Spanish dominant the improvement in Spanish is significant after three years attendance. Project children have higher scores than the no attendance group at age six, but the differences are not enough to be statistically significant.

GOAL 4. CHILDREN WILL IMPROVE IN ENGLISH.

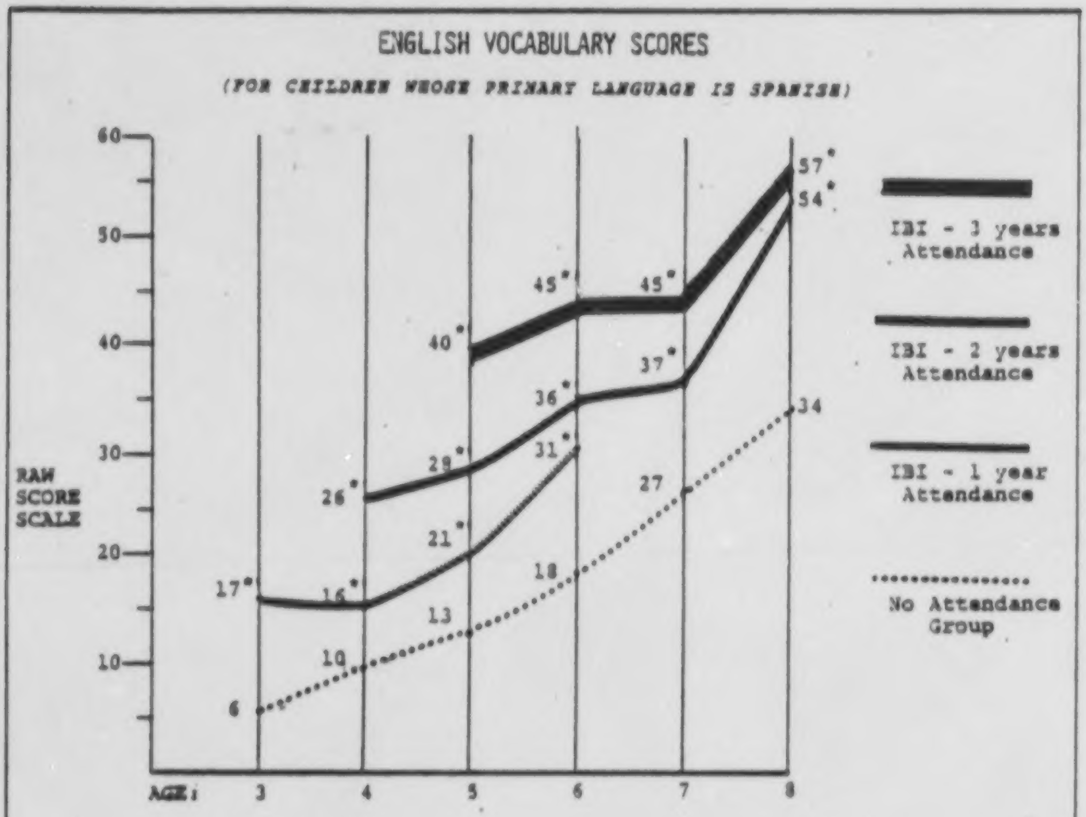
THE IBI CURRICULUM TO TEACH ENGLISH: As described earlier, both English and Spanish are formally taught each day (sometimes every other day depending on the length of time available at a particular site). The DISTAR® Language Curriculum, published by SRA (Science Research Associates) is used. This is a series of lessons that are carefully programmed so that there is sufficient repetition to maintain what the children have learned, while new concepts are added. It provides for fast paced oral language practice, use of the language in context and in whole sentences. The context of the lessons involves language useful to understanding school usage vocabulary, reasoning skills, and readiness concepts.

The English Language curriculum is available at three levels, each level representing 160 lessons, and is used by the project for children from preschool age through third grade. If the children are very young they are started in the IBI "Pre-DISTAR" curriculum. The "Pre-DISTAR" lessons are used to shape the ability of children to follow a teacher presentation in a small group, respond when asked, and it starts with pointing responses leading into responses that require use of one or two words, initially, instead of whole sentence responses.

In addition to the formal language lesson periods, English is taught through use of both languages in teaching of other academic subjects and through informal interaction with children during child choice activity periods, group activities such as singing, etc.

PROJECT RESULTS: Children are tested for receptive vocabulary in English using the Peabody Picture Vocabulary Test, Form A.

Scores on this test are reported in Figures 4 and 5, which follow, and on Tables 6 and 7 in the Technical Appendix.



*$p < .01$ (i.e., the difference between this score and the score of the no attendance group is enough to be statistically significant)

Detailed test score analysis is given in Table 6 in the Technical Appendix.

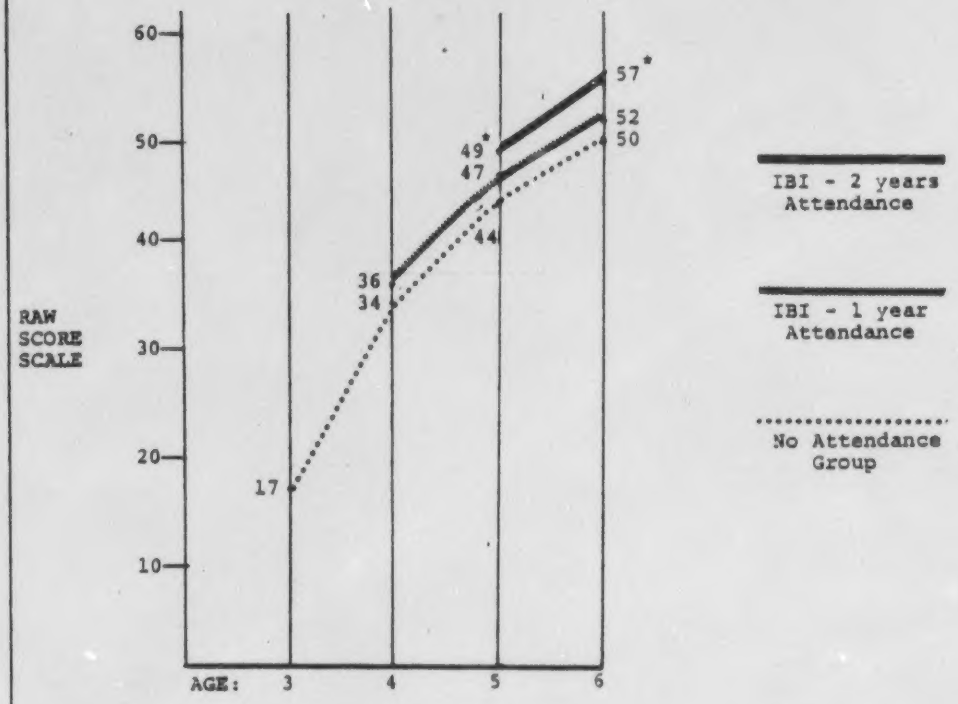
FIGURE 4. ENGLISH VOCABULARY SCORES FROM THE PEABODY PICTURE VOCABULARY TEST FOR CHILDREN WHOSE PRIMARY LANGUAGE IS SPANISH, BY AGE AND PERIOD OF ATTENDANCE IN THE IBI PROGRAM.

TO SUMMARIZE THE FINDINGS IN FIGURE 4:

1. CHILDREN WHO HAVE ATTENDED THE IBI PROGRAM SCORE SIGNIFICANTLY HIGHER IN ENGLISH THAN THE BASELINE, NO ATTENDANCE GROUP, AT EVERY AGE LEVEL.
2. SUPERIORITY OF CHILDREN IS LARGE ENOUGH TO BE STATISTICALLY SIGNIFICANT (I.E., THE PROBABILITY THAT THIS MUCH DIFFERENCE COULD OCCUR BY CHANCE RATHER THAN AS A PROGRAM EFFECT IS LESS THAN ONE IN 100).
3. THE GAINS IN ENGLISH ARE PROGRESSIVE THE LONGER THE CHILDREN ARE IN THE PROGRAM, WITH CHILDREN WHO HAVE ATTENDED THREE YEARS SCORING MUCH HIGHER THAN THOSE ATTENDING TWO YEARS OR ONE YEAR.

ENGLISH VOCABULARY SCORES

(FOR CHILDREN WHOSE PRIMARY LANGUAGE IS ENGLISH)



**p < .05 (i.e., the difference between this score and the score of the no attendance group is enough to be statistically significant)*

Detailed test score analysis is given in Table 7 in the Technical Appendix.

FIGURE 5: ENGLISH VOCABULARY SCORES FROM THE PEABODY PICTURE VOCABULARY TEST, FOR CHILDREN WHOSE PRIMARY LANGUAGE IS ENGLISH, BY AGE AND PERIOD OF ATTENDANCE IN THE IBI PROGRAM.

TO SUMMARIZE THE FINDINGS IN FIGURE 5:

1. (AS IN FIGURE 4) THE ENGLISH DOMINANT CHILDREN ENROLLED IN IBI ALSO SHOW CONSISTENT IMPROVEMENT IN ENGLISH AT EACH AGE LEVEL OVER THE BASELINE, NO ATTENDANCE GROUP, OF THE SAME LANGUAGE DOMINANCE.
2. THE DIFFERENCE BETWEEN THE CHILDREN ENROLLED FOR TWO YEARS AND THE BASELINE GROUPS OF THE SAME AGE IS LARGE ENOUGH TO BE STATISTICALLY SIGNIFICANT (I.E., THE POSSIBILITY SMALL THAT THIS DIFFERENCE WOULD OCCUR BY CHANCE).
3. THERE IS A MEASURABLE INCREASE IN ENGLISH VOCABULARY SCORES FOR EACH ADDED PERIOD OF PROGRAM ATTENDANCE.

Figure 4 shows the average scores for the majority of IBI children, whose primary language is Spanish. The no attendance group provides the basis for judging what the scores of children at each age level would have been without the IBI program. The other lines on the chart show how the children's scores on this test changed after participating in the IBI program for different periods of time. At every age level, the score of children, who had attended even as short a time as one-half school year, is so much higher than the baseline group of the same age that the difference is statistically significant. And each added period of attendance results in similar large gains in English vocabulary. This Figure illustrates very well the importance of longitudinal evaluation, because the distinction is so clear between the child who had benefited from a bilingual program for a number of years vs. a short term exposure.

Figure B reports scores of children for whom English is the primary language. As in most bilingual programs, these children mostly come from homes "in transition" where children are no longer learning much Spanish but are learning English from adults who learned it as a second language and are not very fluent in it. Though "dominant", their English skills are still very low. This group also shows gains in English for each period of IBI project attendance as illustrated in Figure 3. The range of the test for possible improvement is less because these children do not start as low. However, the gains are statistically significant for children who have attended for two years. In the IBI program, few of the English dominant children are continued in the program beyond two years attendance or beyond the age of six, so there were an insufficient number for analysis at the other age levels.

GOAL 5. CHILDREN WILL INCREASE THEIR SKILLS IN MATH.

THE IBI CURRICULUM TO TEACH MATH SKILLS: The IBI project has developed and published a pre-math curriculum in Spanish and English for the preschool age children. This is taught in small groups and in math related independent activities. Children learn numeral recognition, counting sequence, making sets, the concept of equal, etc.

After the pre-math series children begin using consumable workbooks published by Random House under the trade name of Singer "Sets and Numbers." This curriculum is based on set theory and is taught in units. IBI uses this series up through third grade (the upper level in this series uses hard cover books instead of the consumable workbooks).

These math materials can be completely individualized and a teacher can successfully work with a group all of whom may be on different pages or even in different books. Because of the disruptions in schooling experienced by a migrant population, one important criterion used by the project in the selection of curriculum materials was whether the materials could be individualized.

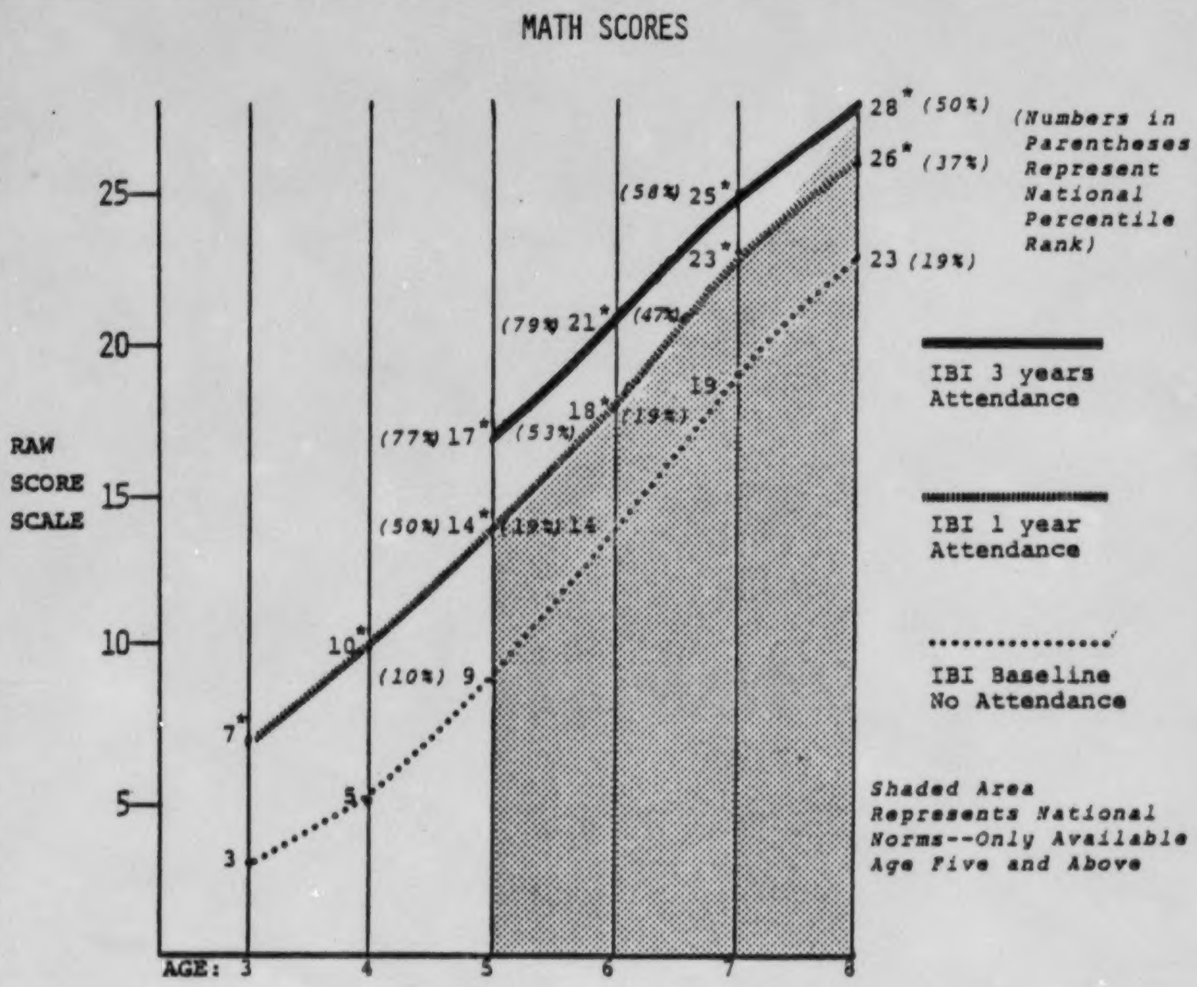
The Sets and Numbers series are published in English only. This has presented no obstacle in their use by bilingual students taught by bilingual paraprofessional teachers. The teachers use both Spanish and English when working with the students, for instructions, praise, and correction. English terminology is used for the mathematical terms and concepts. Since these are new concepts to the children in whichever language they are encountered, the English terminology readily becomes part of their vocabulary.

PROJECT RESULTS: The math subtest of the Wide Range Achievement Test is used to measure math skills. Testers use either English or a project translation to Spanish in administering the test. At this level it was found that there were no significant differences between children based on language dominance; therefore, tests have been pooled for analysis instead of reporting separately by language groups.

The graph in Figure 6 on the following page shows that children in the IBI bilingual program at every age level achieved significantly higher scores than they would have been expected to achieve under conventional educational programs, as represented by the baseline, no attendance, group.

At age five the baseline group who had not attended the IBI preschool had a math score that ranked them at the 10th percentile in terms of national norms, e.g., in the national sample of five year olds only 10% had scores this low or lower. Children who had one year in the IBI preschool, however, started school at five with math scores right up to national norms (50th percentile). Children who had been in the bilingual program for two years scored in the top quartile at ages five and six in terms of math skills, starting school with a large advantage in this academic area.

The IBI children remain far above the baseline group at every age level. Their superiority over the scores of the baseline group after one or more years in the bilingual program is statistically significant (e.g., statistically the chances are remote that this much difference could occur by chance). And, longer periods of attendance consistently increase the academic performance as measured by the math test.



*$p < .001$ (i.e., the superiority of this score over the baseline group of the same age is large enough to be statistically significant)

Detailed analysis of test scores is shown in Table 8 in the Technical Appendix.

FIGURE 6: MEAN RAW SCORES ON THE MATH SUBTEST OF THE WIDE RANGE ACHIEVEMENT TEST, BY AGE AND PERIOD OF ATTENDANCE IN THE IBI PROGRAM, COMPARED TO THE BASELINE NO ATTENDANCE GROUP AND TO NATIONAL NORMS.

TO SUMMARIZE THE FINDINGS IN FIGURE 6:

1. THE SCORES OF THE BASELINE NO ATTENDANCE GROUP INDICATE THAT WITHOUT THE PROGRAM CHILDREN COULD HAVE EXPECTED TO HAVE VERY LOW MATH SKILLS, FAR BELOW THE NATIONAL NORMS.
2. AFTER ONE OR MORE YEARS ATTENDANCE IN THE IBI PROGRAM, THE SUPERIORITY OF CHILDREN IN THE BILINGUAL PROGRAM WAS LARGE ENOUGH TO BE STATISTICALLY SIGNIFICANT AT THE .001 LEVEL (I.E., THE PROBABILITY THAT THIS MUCH DIFFERENCE COULD OCCUR BY CHANCE LESS THAN ONE IN 1000).
3. EACH ADDITIONAL PERIOD OF ATTENDANCE IN THE IBI PROGRAM PRODUCES A CORRESPONDING INCREASE IN MATH SKILLS, WITH CHILDREN WHO HAVE ATTENDED FOR THREE YEARS CONSISTENTLY SCORING AT OR ABOVE NATIONAL NORMS.

GOAL 6. CHILDREN WILL GAIN READING SKILLS IN ENGLISH.

THE IBI CURRICULUM TO TEACH ENGLISH READING: The preschool reading program in IBI is started at about age four using the University of Kansas Reading Primer, which was developed for the Behavior Analysis Head Start and Follow Through programs. The teacher holds a teacher presentation book and children sit in a semi-circle around the teacher. Children learn to respond to pictures going from left to right and from the top to the bottom of the page, and the basic skill of blending sounds. With these word attack skills the children are then able to begin in the Sullivan programmed reading series, published by McGraw-Hill. Once into the Sullivan program, the children can work at their own pace in an individualized program.

The Sullivan materials use a phonetic approach with a controlled vocabulary so that the beginning reader only has to remember one sound for each letter (except for a limited number of irregular words which are taught as sight words). This feature of the curriculum was found to be especially helpful to children whose primary language is Spanish. It means they do not have to cope with the many different sounds which letters take in English until after they have mastered the beginning reading skills of word attack, blending, etc.

The curriculum is programmed so the new material is introduced slowly with continuous review of what has been learned before. The picture illustrations are clear and uncluttered which is helpful to comprehension of a child for whom English is a second language.

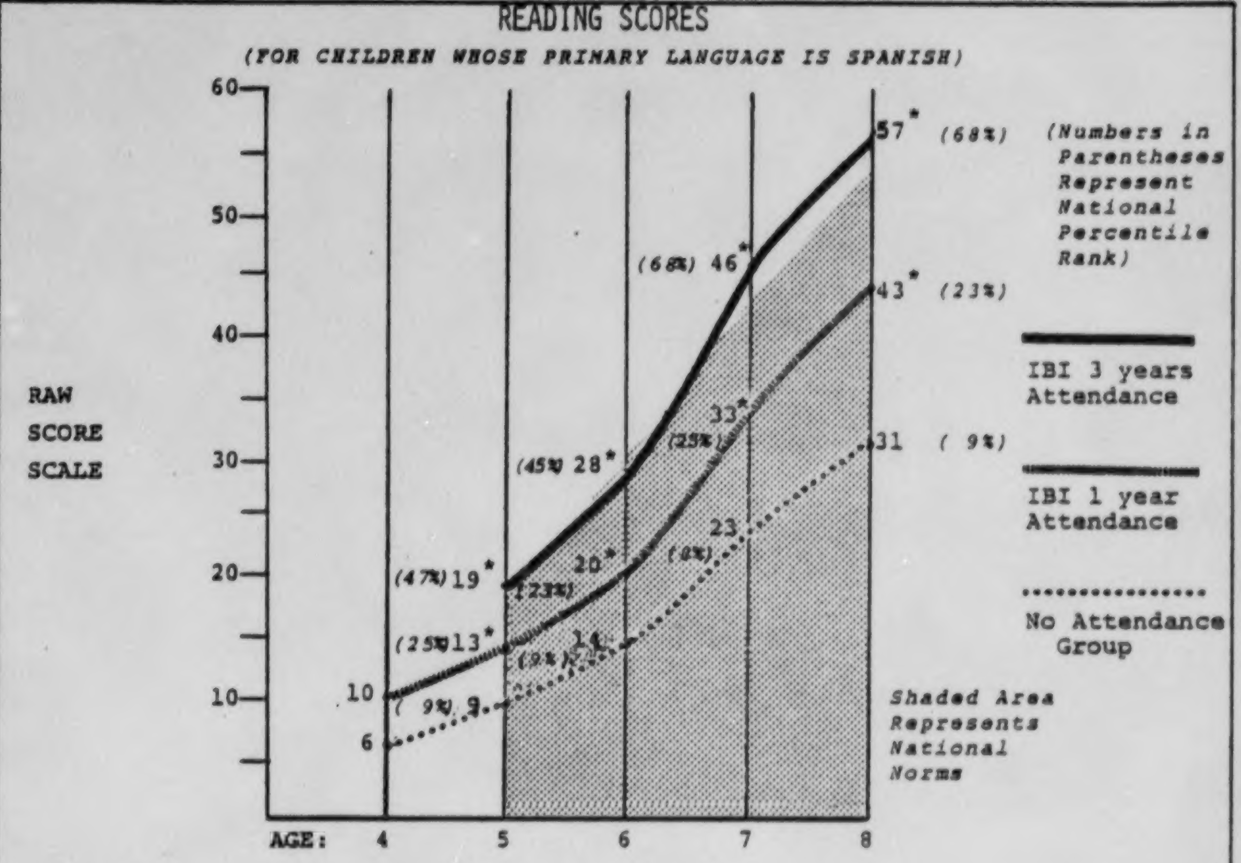
The teacher circulates children working in a small group at a table. Workbooks are starred by the teacher for new sounds and children raise their hands for assistance when they come to a star. This enables the teacher to help the child with the new sound on a one to one basis. The child repeats the sound so the teacher can check that the child is both hearing and making the correct sound when it is first encountered.

This avoids the confusion Spanish speaking children may have in distinguishing sounds in English that are not found in the Spanish language. The teachers are also trained to ask many comprehension questions as they check children's work, and can make explanations in Spanish if there is a comprehension problem.

A teacher is easily able to work with a small group of children each working on a different page, even in different books (there are 23 books in the Sullivan reading series).

PROJECT RESULTS: Project children are tested individually on the reading subtest of the Wide Range Achievement Test. Separate analysis is done for Spanish and English speaking children since the child's primary language group makes a significant difference in their ability to read in English.

Figure 7 which follows illustrates the effect of the IBI program on the English reading scores of children whose primary language is Spanish. The shaded area represents the national norms for this test which are published for age five and above. Looking at the dotted line, which represents the no attendance group, it can be seen that without the program these children score far below the national norms, and that the gap grows wider as the children get older. Children who have been in the IBI program for one year have scores that are significantly higher than the baseline group, but still below the national norms. After three years in the IBI program the average test scores are almost exactly at the national norms for ages five and six, and are above the national norms for ages seven and eight. The superiority of the children who participated in the IBI program over the baseline group is statistically significant, i.e., statistically there is a very remote possibility that this much difference in scores between two groups would occur by chance. An increase in scores of from 40 to 60 percentile ranks would also clearly be educationally significant.



$p < .01$ (i.e., the difference between this score and the no attendance group of the same age is enough to be statistically significant)

Detailed analysis of test scores is shown in Table 9 in the Technical Appendix.

FIGURE 7: MEAN RAW SCORES AND PERCENTILE RANKS ON THE READING SUBTEST OF THE WIDE RANGE ACHIEVEMENT TEST FOR IBI PROJECT CHILDREN WHOSE PRIMARY LANGUAGE IS SPANISH, BY AGE AND PERIOD OF ATTENDANCE, COMPARED TO THE BASELINE GROUP AND TO NATIONAL NORMS.

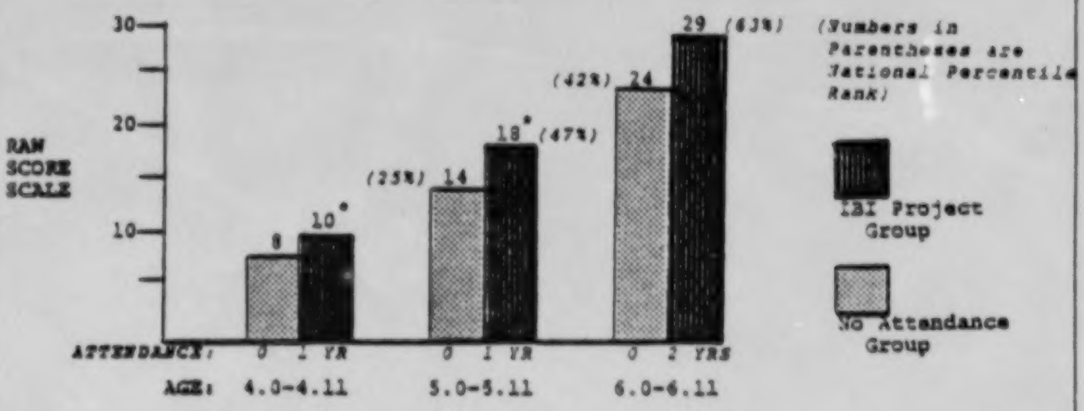
TO SUMMARIZE THE FINDINGS IN FIGURE 7:

1. SCORES OF THE BASELINE NO ATTENDANCE GROUP SHOW THAT WITHOUT THE PROGRAM CHILDREN HAD READING SCORES FAR BELOW THE NATIONAL NORMS, CONSISTENTLY IN THE LOWEST TEN PERCENT AS COMPARED TO CHILDREN IN THE NATIONAL NORMS.
2. AFTER ONE YEAR IN THE IBI BILINGUAL PROGRAM, CHILDREN'S SCORES WERE AVERAGING AROUND THE 25TH PERCENTILE, WHICH WOULD BE CONSIDERED AS LOW "NORMAL" RANGE.
3. SPANISH DOMINANT CHILDREN IN THE IBI PROGRAM FOR THREE YEARS HAD SCORES IN ENGLISH READING THAT AVERAGED AT OR ABOVE NATIONAL NORMS BY THIS TEST.
4. GAINS OF IBI CHILDREN IN ENGLISH READING WERE BOTH STATISTICALLY AND EDUCATIONALLY SIGNIFICANT.

Figure 8 shows the reading gains by the children who were dominant in English when they started the IBI program. The IBI program also improved reading scores in every age group among the English dominant children, although initial scores were not as low and overall gains therefore not as large. After one year in the program the superiority of the IBI group over the baseline group was enough to be statistically significant for four and five year olds. By age six the average reading scores were above the national norms. As noted before, relatively few English dominant children remain in the program longer than two years nor beyond age six, so the analysis is limited to this lower age group.

READING SCORES

(FOR CHILDREN WHOSE PRIMARY LANGUAGE IS ENGLISH)



$p < .01$ (i.e., the difference between this score and the no attendance group of the same age is enough to be statistically significant)

Detailed analysis of test scores is shown in Table 10 in the Technical Appendix.

FIGURE 8: MEAN RAW SCORES AND PERCENTILE RANKS ON THE READING SUBTEST OF THE WIDE RANGE ACHIEVEMENT TEST FOR IBI CHILDREN WHOSE PRIMARY LANGUAGE IS ENGLISH, BY AGE AND PERIOD OF ATTENDANCE, COMPARED TO THE BASELINE GROUP AND TO NATIONAL NORMS.

TO SUMMARIZE THE FINDINGS IN FIGURE 8:

1. THE ENGLISH DOMINANT CHILDREN ENROLLED IN THE IBI PROGRAM MADE GAINS IN ENGLISH READING AT EVERY AGE LEVEL.
2. THE SUPERIORITY OF FOUR AND FIVE YEAR OLD CHILDREN OVER THE BASELINE NO ATTENDANCE GROUP OF THE SAME AGE AND LANGUAGE DOMINANCE IS STATISTICALLY SIGNIFICANT.
3. BY AGE SIX, ENGLISH DOMINANT CHILDREN IN THE IBI PROGRAM HAD ENGLISH READING SCORES ABOVE THE NATIONAL NORM.

GOAL 7. CHILDREN WILL GAIN READING SKILLS IN SPANISH.

THE IBI CURRICULUM TO TEACH SPANISH READING: IBI developed a Primer in Spanish reading which is called Comenzando a Leer. It uses a teacher presentation book, with the teacher modeling and requiring the children seated around in a semicircle to give group responses, then individual responses to check mastery. This primer is used to teach children a set of beginning sounds with which the child can learn blending skills necessary for independent work in the programmed reading series used by the project.

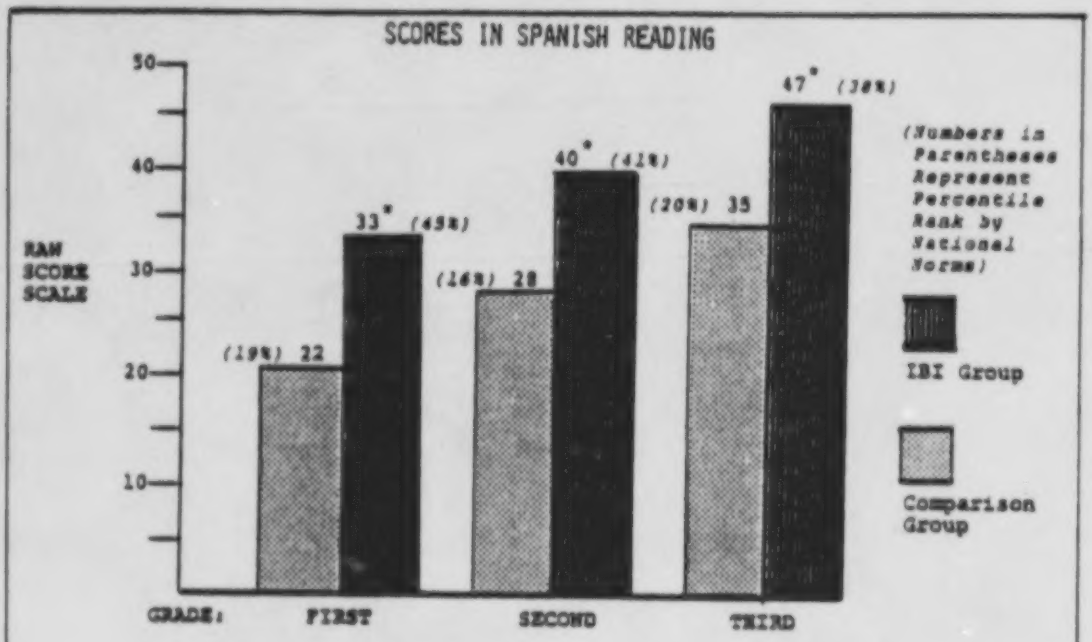
Upon completion of the Primer, children begin work in a commercial reading series published by Behavior Research Lab which is called Aprendiendo a Leer. This is a parallel reading program to the Sullivan Programmed Reading used by IBI to teach reading in English. It has consumable workbooks in which chilren can work independently at their own pace, checking their work through the marginal answer column. The teacher moves from child to child introducing new sounds, asking comprehension questions, and hearing children read aloud as the accuracy of the child's work is checked. There are only six workbooks in the Spanish reading series (compared to 23 in English), since the authors feel children can master basic decoding and word attack skills in Spanish much more easily than in English because the sound-symbol system is much more consistent than it is in English.

PROJECT RESULTS: Skills in Spanish reading are tested using the Prueba de Lectura, Serie Interamericana. This is probably the most widely used test for Spanish reading utilized by bilingual programs in the United States.

The comparison group for Spanish reading comes from children tested in a neighboring school district in south Texas. These children are receiving regular instruction in Spanish reading, and like children in the IBI program, these children are all migrant and come from families whose primary language is Spanish.

Figure 9 demonstrates the scores in Spanish reading of children in the IBI program and in the comparison school. As shown, et each grade level, the average scores of children in the IBI program are significantly higher than those of children in the comparison school.

National norms for this test have just become available and the percentile rank corresponding to the raw scores are shown in parentheses. The IBI children's scores are far above the comparison group who did not have the program, but are still below the national norms for Spanish reading and tend to decline in relationship to the national norms at higher grade levels.



*$p < .01$ (i.e., the difference between this score and the comparison group of the same grade level is enough to be statistically significant)

Detailed statistical analysis is given in Table 11 in the Technical Appendix.

FIGURE 9: MEAN RAW SCORES AND NATIONAL PERCENTILE RANKS ON PRUEBA DE LECTURA, Serie INTERAMERICANA, BY GRADE LEVEL FOR IBI CHILDREN AND A COMPARISON GROUP FROM A NEIGHBORING SCHOOL.

TO SUMMARIZE THE FINDINGS IN FIGURE 9:

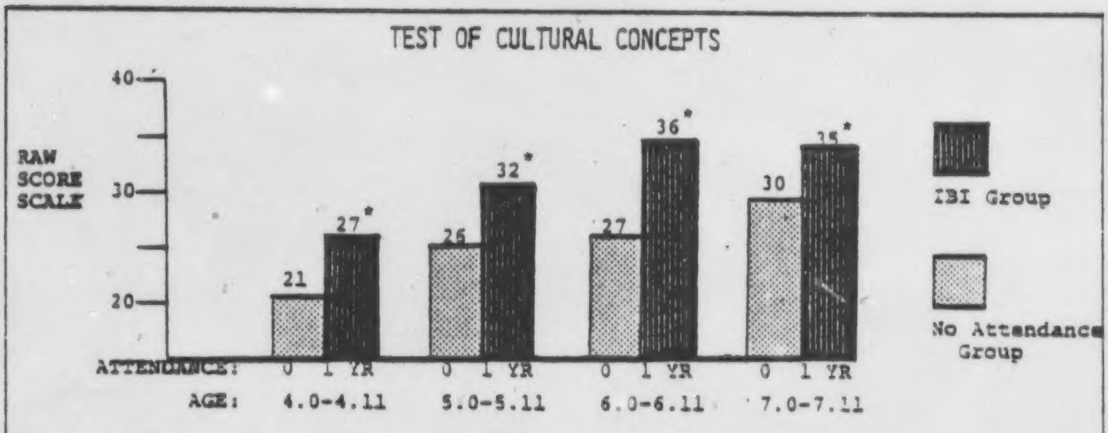
1. CHILDREN IN THE IBI PROGRAM AVERAGE HIGHER SCORES IN SPANISH READING THAN A COMPARISON GROUP FROM A NEIGHBORING SCHOOL DISTRICT.
2. AT EVERY GRADE LEVEL, THE SUPERIORITY OF CHILDREN IN THE IBI PROGRAM OVER THE COMPARISON GROUP IS LARGE ENOUGH TO BE STATISTICALLY SIGNIFICANT, I.E., THE PROBABILITY THAT THIS MUCH DIFFERENCE WOULD RESULT FROM CHANCE IS LESS THAN 1 IN 100.
3. THE IBI CHILDREN AVERAGE SCORES SOMEWHAT BELOW NATIONAL NORMS DEVELOPED FOR THIS TEST, AND TEND TO FALL FARTHER BELOW THE NATIONAL NORMS AT THE HIGHER GRADE LEVELS.

GOAL 8. CHILDREN WILL LEARN ABOUT THEIR CULTURAL HERITAGE.

THE IBI CURRICULUM TO DEVELOP MULTI-CULTURAL KNOWLEDGE: The types of activities which are included in the IBI curriculum relating to knowledge about the United States, Mexican, and other cultures, include songs and dances, children's games, activities related to holidays and the birthdays of national figures, etc. IBI has prepared a book as a reference source on activities related to the Mexican culture. In addition, it has prepared kits for teachers to use with materials and activity ideas related to many world cultures (Chinese New Year, Danish Christmas, etc.) and kits have also been prepared in reference to United States holidays and traditions. This is the only aspect of the IBI bilingual curriculum that is not sequentially presented. Time is scheduled regularly for these activities; however, use of this scheduled time is generally a matter of teacher choice and no particular content is mandated.

PROJECT RESULTS: The IBI program developed its own test of cultural concepts, known as the BMHS Test of Cultural Concepts. This is a 44-item test in six general content areas: songs, dances or games, clothing, food, holidays or celebrations, and national symbols. Half of the items relate to Mexican culture, the other half to U.S. culture. The tester gives a question in Spanish for the Mexican items, in English for the U.S. items. In the case of music and dance, the cues given are recorded music.

Figure 10 which follows indicates the gains made by children in acquiring cultural concepts as measured by this test. The superiority of children after one or more years in the IBI program over the no attendance group is large enough to be statistically significant at every age level. (It should be noted, because of reduced funding, testing in this area was discontinued so the results reported are gains made by children up to, but not including, the current program year.)



*$p < .05$ (i.e., the difference between this score and the "no attendance" group of the same age is large enough to be statistically significant)

Detailed test score analysis is given in Table 12 of the Technical Appendix.

FIGURE 10: MEAN RAW SCORES ON THE BMHS TEST OF CULTURAL CONCEPTS BY AGE AND PERIOD OF ATTENDANCE.

TO SUMMARIZE THE FINDINGS IN FIGURE 10:

1. CHILDREN ATTENDING THE IBI PROGRAM SHOW A GREATER KNOWLEDGE OF CONCEPTS RELATED TO THEIR BICULTURAL BACKGROUND THAN CHILDREN OF THE SAME AGES WITH NO ATTENDANCE IN THE PROGRAM.
2. THE SUPERIORITY OF CHILDREN'S SCORES AFTER ONE YEAR OR MORE ATTENDANCE IN THE IBI PROGRAM OVER THE NO ATTENDANCE GROUP IS LARGE ENOUGH TO BE STATISTICALLY SIGNIFICANT.

GOAL 9. IBI MOBILE GROUP* WILL EXCEED COMPARISON GROUP.

THE NEED ON WHICH THIS GOAL WAS BASED: The IBI program has a mobile component which was designed to provide continuity of educational instruction from one location to the next for children who must move during the school year because the parents follow the crops. Such moves make it difficult for migrant children to learn basic skills such as reading and math because the approach may be very different from one school to the next resulting in confusion. Each curriculum has a different organization so that a child may miss concepts that are essential to later understanding. Many areas to which the children move do not have a large resident population who are Spanish speaking, and therefore are not prepared to offer bilingual instruction. The child has the anxiety involved in adjusting to a new school, new teachers, which impedes learning. Schools may choose not to "use up" expensive workbooks for a child expected to attend six to eight weeks, so utilize less convenient and less attractive dittoed materials. At each site it takes time for placement, assignment of materials, organizational tasks, tests and paperwork. All of these constitute the hardships of acquiring an education in a family following the crops which represent the need for an alternative approach.

THE IBI PROGRAM TO ACHIEVE CONTINUITY AS CHILDREN MOVE: One component of the IBI project is the "mobile component." In this component children in the south Texas town of La Grulla are surveyed to see what northern locations their families expect to move to during the migrant season. Adults from migrant families going to an area where a cluster of children will be going are then recruited as teachers in the mobile component. During the winter months the teachers are trained, and they provide instruction in the year-round center at the Texas site.

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*These are project children in the mobile component of IBI who were enrolled both in Texas and in one or more northern locations under mobile teachers who moved with them from site to site.

When the migration is about to begin, the staff "site coordinator" travels north and lines up facilities for the preschool age children if no local programs exist. If there are local programs either the site coordinator or another of the administrative staff works out a cooperative agreement whereby the mobile staff will be assigned to assist in the local program in return for released time during the morning to continue the bilingual instruction of the children being followed from Texas. Similar contacts are made with the schools. Often the cooperating northern school will assist by assigning all children in the IBI program to the same school location and working with teachers to allow released time so children may continue the bilingual instruction under the mobile teachers for part of their school day. Usually the schools arrange some space for this instruction as well. Sometimes the school-age children must be taught in the labor camp areas where the families live in the evening or after school.

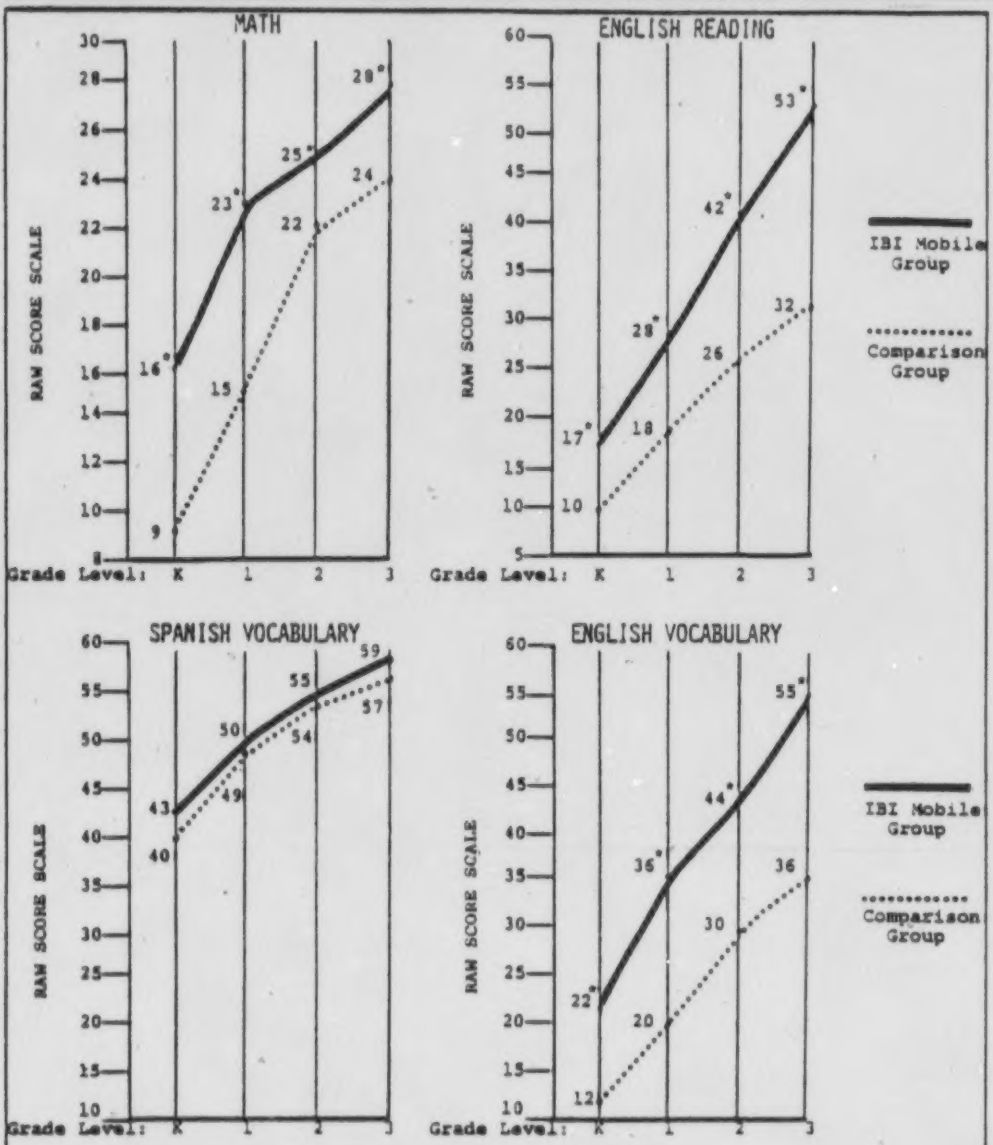
Most of the teaching staff from the La Grulla site do relocate to the north for part of each year--some moving to more than one location in the north before returning to Texas. All of the training and administrative staff also relocates for part of the year--staggering the time they are gone in order to provide ongoing supervision of both the mobile component sites (which are scattered in the north) and the Texas program which continues for a small proportion of the children year-round.

The mobile component is experimentally small--normally involving 60 to 90 children and a dozen or so staff members. At the same time in some years it has succeeded in following as many as 75% of the children who leave La Grulla with their families following the crops. It provides the advantage of continued bilingual instruction for these children as an addition to the schooling they receive through the schools in migrant host communities. It enables them to follow the instructional sequence of the IBI curriculum wherever they left off (and special mastery tests keyed to all areas of the IBI curriculum are used to discover material they may have forgotten and need to review after an absence). Children have familiar teachers for at least part of the day to bridge the anxieties of changing schools. Through the IBI curriculum children follow one program approach in basic skills subjects for part of the day which makes it less important that the changing programs offered by the schools they attend may leave gaps and discontinuities.

The educational program uses the same materials and teaching methods described elsewhere in this evaluation.

PROJECT RESULTS: The IBI mobile group of children were Spanish dominant school-age children from the mobile component who had been enrolled in the program both in Texas and in one or more northern locations, and who had been in the IBI program for at least 200 days. The comparison group children were in kindergarten through third grade from a neighboring community to La Grulla, Texas. Children in the comparison group were Spanish dominant, had approximately the same socioeconomic level as IBI project children, and came from families which migrated each year in order to do seasonal farm work. In making this special study in reference to the mobile component the factor of migration is held constant: only IBI project children who migrated were tested, only comparison group children who migrated were tested.

Figure 11 shows the vocabulary scores in Spanish and in English for the two groups. The IBI mobile children achieve a small superiority in Spanish at each grade level. In English the IBI mobile children achieve a great superiority



$p < .001$ (i.e., the superiority of this score over the comparison group of the same grade level is enough to be statistically significant at the .001 level)

Statistical detail is shown in Tables 13-16 in the Technical Appendix.

FIGURE 11: MEAN RAW SCORES ON THE WIDE RANGE ACHIEVEMENT TEST, MATH AND READING SUBTESTS, AND ON THE PEABODY PICTURE VOCABULARY TEST, FORM A IN ENGLISH AND FORM B IN SPANISH, FOR IBI MOBILE GROUP AND COMPARISON MIGRANT CHILDREN, BY GRADE LEVEL.

TO SUMMARIZE THE FINDINGS IN FIGURE 11:

1. AT EVERY GRADE LEVEL, THE IBI MOBILE GROUP IS SUPERIOR IN MATH AND IN ENGLISH READING TO THE COMPARISON GROUP CHILDREN AND IN EVERY CASE THE SUPERIORITY IS LARGE ENOUGH TO BE STATISTICALLY AND EDUCATIONALLY SIGNIFICANT.

2. THE DIFFERENCE BETWEEN THE SCORES OF THE IBI MOBILE GROUP AND THE COMPARISON GROUP IN ENGLISH READING TENDS TO INCREASE WITH HIGHER GRADE LEVELS, ROUGHLY PARALLEL TO THE INCREASES IN THE ENGLISH VOCABULARY SCORES.

3. THE IBI MOBILE GROUP CHILDREN HAVE HIGHER MEAN VOCABULARY SCORES IN BOTH SPANISH AND IN ENGLISH THAN THE COMPARISON GROUP CHILDREN OF COMPARABLE GRADE LEVELS.

4. THE SUPERIORITY IN VOCABULARY SCORES OF THE IBI MOBILE GROUP IS STATISTICALLY SIGNIFICANT IN ENGLISH; IT IS NOT STATISTICALLY SIGNIFICANT IN SPANISH. IT INDICATES, HOWEVER, THAT THE IBI CHILDREN HAVE MAINTAINED AND IMPROVED THEIR SPANISH AT THE SAME TIME THAT THEY HAVE GREATLY IMPROVED THEIR ENGLISH SKILLS.

over the comparison group with the gap widening at each grade level. By the third grade it will be observed that the mean score in English achieved by the children is only slightly below their score in Spanish.

The superiority of the IBI mobile group in English is statistically significant at every grade level over the scores of the comparison group. The superiority of the IBI mobile group in Spanish is not sufficient to be statistically significant. However, the fact that the children in the IBI bilingual program have maintained and improved their Spanish at the same time they have greatly improved their English is important in view of the controversy over "maintenance" vs. "transitional" bilingual programs. An underlying assumption in this controversy seems to be that maintaining Spanish skills must necessarily detract from the acquisition of English skills. The findings in the IBI project do not support this assumption.

Figure 11 also compares the mobile and the comparison group in their math and reading scores. In every grade level in both math and reading the superiority of the IBI mobile group is statistically significant beyond the .001 level (e.g., the possibility that this much difference would occur by chance less than one in 1,000).

The mean standard scores in math and reading are reported in the detailed test score analysis given in Tables 13 and 14 in the Technical Appendix. These allow the comparison of both groups to national norms. For the national norms a mean of 100 is used and scores of from 90 to 109 represent an average range (the middle 50%) in reference to the national norm group. The migrant children in the comparison group have scores far below the average range in reading in English, and slightly below the average range in mathematics, a subject in which language is less of a factor. The IBI project children have scores within the average range in both subjects. In mathematics their scores run above the national mean in kindergarten and first grade, probably reflecting the participation of the children in the academic preschool program. Because of the preschool program children have been able to acquire English skills before reaching school age, and to maintain pace with other children from the majority culture and language in learning to read. As must be expected, the scores in reading in English of both groups closely parallels their scores in English vocabulary. These findings would seem to support the expansion of bilingual programs into the preschool years, so the child starts with a reasonable language facility and isn't playing catchup in the academic subjects that depend on English (e.g., English language arts).

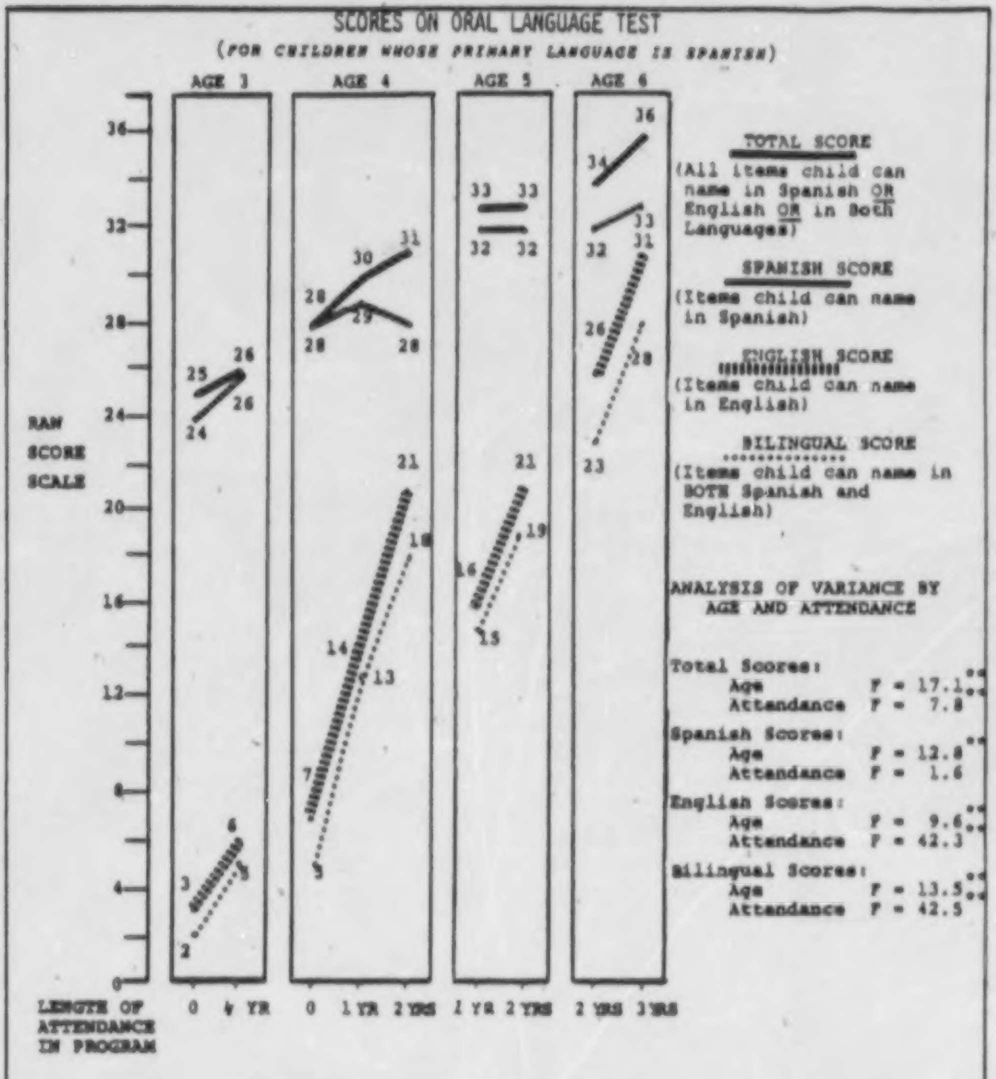
HOW HAVE CHILDREN IMPROVED THEIR ORAL LANGUAGE SKILLS?

The evaluation plan for the IBI program has used the Peabody Picture Vocabulary Test (in Spanish and in English) as the primary measure of children's knowledge of the two languages. However, the project has long recognized that this test, which measures only auditory comprehension of the language, represents only a small aspect of the ability to communicate in two languages which the IBI program is trying to develop.

There were very few language tests available in 1971 when this program was started. However, there has been a great deal of effort put into test development during the seventies, and IBI has been trying to find (and to develop) additional tests that will provide a more comprehensive measure of language proficiency. The Northwest Regional Educational Laboratories published a catalog of oral language language tests in 1976. Most of these were so new and experimental that they had almost no reliability or validity data to report. From this catalog IBI selected The Pictorial Test of Bilingualism and Language Dominance, published by Texas Testing Services of Corpus Christi, Texas on the basis that it had relatively more evidence of reliability testing in its development than other tests listed. The project began using the test in 1978. However, it has not been incorporated into the regular evaluation design because there had not been a sufficient number of tests given to establish a baseline group for most age levels.

When the testing period was closed for this evaluation, the oral language tests were analyzed and for children whose primary language is Spanish, there were enough tests in enough age and attendance categories to draw some conclusions, so this report has been added to the evaluation.

Figure 12 which follows graphs the scores of children in various attendance categories where there were enough tests for analysis (minimum of 10) at ages three, four, five,



*$p < .01$ (i.e., the differences between groups based on this variable are enough to be statistically significant)

Statistical detail is shown in Table 17 in the Technical Appendix.

FIGURE 12: MEAN RAW SCORES ON THE PICTORIAL TEST OF BILINGUALISM AND LANGUAGE DOMINANCE, BY AGE AND PERIOD OF ATTENDANCE IN THE IBI PROGRAM.

TO SUMMARIZE THE FINDINGS IN FIGURE 12:

1. SCORES IN ENGLISH SHOW A LARGE INCREASE FOR EACH ADDED PERIOD OF ATTENDANCE WITHIN EVERY AGE LEVEL, AS WELL AS AN OVERALL INCREASE RELATED TO AGE.
2. SCORES IN SPANISH TEND TO REMAIN THE SAME OR TO SHOW A SMALL INCREASE BASED ON LENGTH OF ATTENDANCE IN THE PROGRAM WITHIN EACH AGE LEVEL, BUT SHOW AN OVERALL INCREASE RELATED TO AGE.
3. THE TOTAL SCORES AND BILINGUAL SCORES DEMONSTRATE THAT THE CHILDREN KNOW SOME TERMS IN EACH LANGUAGE THAT THEY DO NOT KNOW IN THE OTHER, BUT BOTH THEIR TOTAL LANGUAGE AND THEIR BILINGUAL COMPETENCY INCREASES WITH PROGRAM ATTENDANCE.
4. FOR ENGLISH SCORES AND BILINGUAL SCORES, THE ANALYSIS OF VARIANCE SHOWS THAT ATTENDANCE IN THE PROGRAM CONTRIBUTES FAR MORE TO DIFFERENCES IN SCORES THAN THE AGE VARIABLE, ALTHOUGH BOTH ARE SIGNIFICANT.
5. FOR SPANISH SCORES AND TOTAL SCORES AGE ACCOUNTS FOR MORE OF THE DIFFERENCE IN SCORES THAN PROGRAM ATTENDANCE. THE SMALL INCREASE IN SPANISH SCORES BASED ON ATTENDANCE IS NOT STATISTICALLY SIGNIFICANT. ATTENDANCE DOES SIGNIFICANTLY INCREASE THE TOTAL SCORE.

and six.

The "Spanish Score" represents the number of items the child was able to name in Spanish. As the graph shows, this increases with maturity, older children scoring higher than younger children, but within the age groups there is only a small increase related to attendance in the program for longer periods of time. This is reflected in the analysis of variance report on the figure. This statistical procedure is used to compare a number of groups. Essentially it asks the question whether there is more difference in scores between different groups on some basis (we used age and length of attendance in the program), than there are differences within the groups that might come simply from different levels of basic ability, motivation, or any number of other reasons why children would score differently on a test. The result is an "F" score and if the F score is very low, as it is on Figure 12 for Spanish scores, looking at difference between groups based on different periods of attendance, the result is considered "not significant" statistically. In other words, in Spanish -- as measured on the oral language test, children make significant gains simply from maturity, but the project is not contributing enough to their oral language skills to be statistically significant in their primary language.

In their English scores, however, there is a significant effect found for age (higher scores as they get older), and a very significant effect (a much higher "F" value) found for attendance in the project. This means that within the environment these children are living in, they would increase their English vocabulary a little as they grow older, but by being in the project they have made a very substantial increase in English. As will be noted on the chart in Figure 12, children who had attended the program for three years, at age six, had an English score almost as high as their Spanish score. On the other hand, children entering the IBI program at ages three and four had very little knowledge of English. At age four, there are enough children in the different attendance categories to see the progress clearly from the "no attendance" category, and for children who had attended the IBI program for one or for two years. In all age categories, however, the increase brought about by attendance in the program is very clear.

The oral language test has two other types of scores besides the Spanish and English scores. One of these is the "Bilingual Score". This means the number of items the child can name in BOTH Spanish and English. On the chart in Figure 12, this is the lowest score in every category, i.e., the children know some items in English that they do not know in Spanish and some in Spanish that they do not know in English. The other score is the "Total Score". This represents all items the child could identify in one language, OR the other, or in both. The gap between them represents the difference between the total language capacity of the child, given access to two languages, and the level of bilingual competency, i.e., can manage equally well in either one.

Since these children are Spanish dominant, most of their total score is made up of their knowledge of Spanish and the total scores and Spanish scores are quite close together. Their bilingual scores similarly parallel their gains in English. In both cases, the analysis of variance shows a significant increase related to age, and a significant increase brought about by attendance in the program. In summary, the project is making a significant difference to children in improving their total oral language skills, and increasing their bilingual competency.

The findings from the oral language test and from the auditory vocabulary test reported earlier are the same in reference to recording very large and statistically significant gains in English. In reference to Spanish, both tests show gains in Spanish that were small, but for the auditory test the gains based on program attendance were nonetheless statistically significant, and for the oral test the gains were not statistically significant. The oral language test has a narrower range for measuring change (three year olds enter with an average score of 24 in Spanish and it is only a 40 item test, so the range for measurement of change in the primary language is only 16 items). Except for the difference in findings of statistical significance, the findings are parallel--the project maintains and improves the primary language and contributes significantly to total language development and bilingual competency.

IS THE EFFECT OF BILINGUAL INSTRUCTION DIFFERENT IN THE NORTH THAN IN THE SOUTH TEXAS AREA?

The evaluator has gone beyond the original evaluation design in this section in order to examine what the interaction is between community factors and the bilingual education program.

The inclusion of this study in the report is in recognition of the fact that bilingual education programs do not exist in a vacuum. They are very much influenced by the relationship between the dominant society and the linguistic minority; in the community attitudes toward use of the two languages, and the extent to which social and economic rewards are tied to competence in one language or the other.

The IBI program is unique in that it operates parallel bilingual education programs in communities in Washington state and in Texas on the border with Mexico. The communities in these two states are almost at opposite ends of a continuum of language usage; much support of Spanish and little pressure to learn English in the Texas border town, and very little support of Spanish with a great deal of pressure for language shift to English in Washington state. At the same time, the educational programs conducted by IBI in these communities and the characteristics of the children served are as nearly as possible the same in both locations. This makes it possible to look at differences in outcomes for children enrolled in the north and those enrolled in the south, and use this as a measure of how much of the change can be attributed to the program, and how much may represent the influence of community factors which shape the "rest of the day" outside school hours. On the basis of these comparative findings the evaluator has drawn some conclusions which have implications beyond this particular program to issues of much broader concern to people interested in the potential of bilingual education.

Language characteristics of the South Texas program location

The Texas IBI program operates in La Grulla, Texas, a small border town located about two miles from the Rio Grande River which forms the border between the U.S. and Mexico. Some of the most successful programs of bilingual education (such as the St. Lambert program in Canada) have involved the learning of a second language in a situation in which the children are in no danger of losing their first language because it is the dominant, or the "economic" language of the community. A border community such as La Grulla is about the only section of the United States that approximates this situation for Spanish speaking children: there is no danger of the children losing their Spanish in La Grulla because nearly all social interaction in the community, in their home and social life, takes place in Spanish. Spanish might also be considered the "economic" language of the community in that there are almost no jobs available except farm labor, and the crew bosses and others through whom these jobs are arranged are most likely to speak Spanish.

There are many radio stations using Spanish in La Grulla, and TV channels in Spanish received from Mexican stations, so that most of the media entertainment and news heard in La Grulla is in Spanish. Learning English in this setting therefore becomes an added skill, a school language useful in the classroom and a language that will be useful in other places and other pursuits, but is not reinforced much in the daily lives of the children.

Language characteristics of the Washington state program locations

For the children enrolled in the northern IBI sites in

Washington state, the situation is more typical of that found in the rest of the United States. Spanish is a minority language, used in few public settings and seldom heard on either radio or TV. The "economic" language of the community is English, since all better paying jobs depend on the acquisition of English. As soon as Spanish speaking children move beyond the home, their social contacts will increasingly depend on their ability to communicate in English. The family attitude is quite likely to be that to "get ahead" the child must learn English, so that home and community factors combine to stress the importance of English.

Similarities and differences in the IBI program in the North and in the South

The IBI programs operated in La Grulla, Texas and in Washington state are designed and administered to be the same. They use the same curriculum materials and have the same amount of time scheduled for the study of each language and academic subjects. The instructional approach is the same; teacher-child ratios the same. Teachers at all sites are recruited and hired through committees in each community made up of representatives from the parent group and local training or supervisory staff, and all teachers are required to demonstrate that they are bilingual. About half the teachers at each site are parents of children served and all are from the same linguistic, ethnic, and socioeconomic group as the children.

Children in both locations are from migrant families so they represent the same socioeconomic group, and nearly all (e.g., over 95%) of the children in both locations are Mexican-American or Mexican.

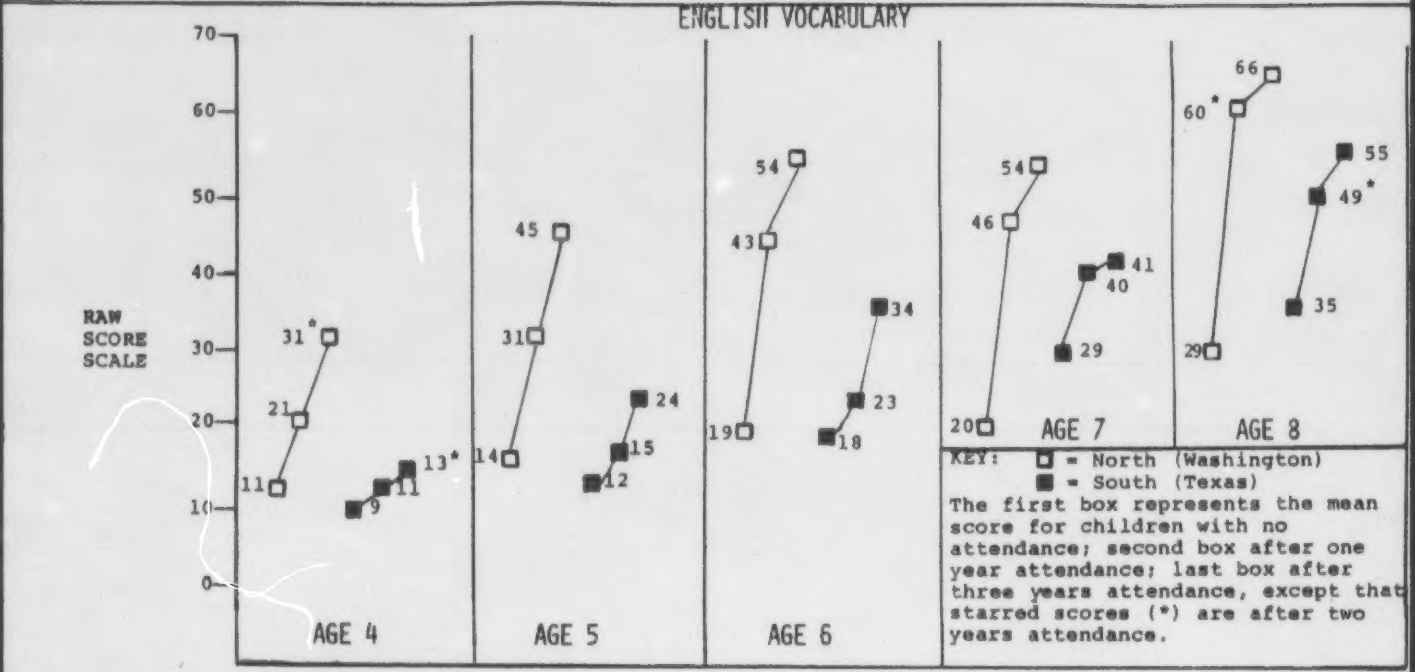
The main difference in the program is that children would hear more English used by other children in Washington state than in Texas. This is because there are migrant children eligible for the program in Washington state who come from families in the process of language shift, so some children enter the program knowing more English than Spanish. (Statistics on language classification of children enrolled in IBI is in Table 1 found on Page 8.) This has not occurred in La Grulla so that all the children in Texas enroll as Spanish dominant (the few exceptions were transient enrollment of children who stayed less than one year). The same applies to the use of English by the teachers recruited in each location. None of the teachers in Texas rated themselves as speaking better English than Spanish, but 43% of the teachers in Washington rated their English as better than their Spanish. (See Table 2 on Page 15.)

For this comparative analysis none of the scores of children whose primary language was English have been included, since there are none at the Texas site. The children in both locations are therefore alike in that their highest vocabulary test scores when they enrolled in the program was Spanish and this was the primary language of the home.

What are the North/South differences for IBI children in the learning of English?

Figure 13 which follows shows the increases in English vocabulary scores after one and after two or three years in the IBI program for children enrolled in Washington and those enrolled in Texas, all of whom were Spanish dominant when they entered the program.

This Figure shows a very significant increase in English vocabulary scores for each period of attendance in the IBI program at both sites. However, the differences by location are striking, particularly the very large increase within the first year of program enrollment for every age level in the northern centers. The overall English scores



ANALYSIS OF VARIANCE FOR MAIN EFFECTS:	AGE 4	AGE 5	AGE 6	AGE 7	AGE 8
ocation--Washington or Texas:	F=111.8**	F=234.9**	F= 81.6**	F= 0.8	F= 1.1
ime Attended IBI:	F= 37.4**	F= 36.7**	F= 38.0**	F= 8.5**	F= 14.2**

** $p < .01$ (e.g., the difference between groups based on this variable is large enough to be statistically significant)

DETAILED STATISTICAL ANALYSIS IS GIVEN IN TABLE 18 IN THE TECHNICAL APPENDIX.

FIGURE 13: MEAN RAW SCORES IN ENGLISH VOCABULARY AS MEASURED BY FORM A OF THE PEABODY PICTURE VOCABULARY TEST, BY LOCATION AND PERIOD OF ATTENDANCE IN THE PROGRAM

O SUMMARIZE THE FINDINGS IN FIGURE 13:

. ATTENDANCE IN THE BILINGUAL PROGRAM RESULTS IN STATISTICALLY SIGNIFICANT GAINS IN ENGLISH VOCABULARY IN BOTH THE NORTH AND SOUTH AT EVERY AGE LEVEL.

. IN THE NORTHERN SITES THE GAINS IN ENGLISH ARE MUCH MORE RAPID THAN IN THE SOUTH, SHOWING PARTICULARLY LARGE INCREASES WITHIN THE FIRST YEAR OF ATTENDANCE FOR EVERY AGE LEVEL.

. THE INCREASE IN ENGLISH SCORES BY PERIOD OF ATTENDANCE IS MORE RAPID IN THE NORTH AND OVERALL AVERAGE SCORES HIGHER, RESULTING IN A STATISTICALLY SIGNIFICANT DIFFERENCE BETWEEN NORTH AND SOUTH FOR AGES FOUR, FIVE AND SIX. HOWEVER, BY AGES SEVEN AND EIGHT, DIFFERENCES BASED ON LOCATION ARE NO LONGER ENOUGH TO BE STATISTICALLY SIGNIFICANT.

after two or three years are also much higher in the North than in Texas, although the differences are less for each age level as the children get older.

The statistical analysis below the Figure shows that the overall differences in scores between North and South locations are large enough to be statistically significant for ages four, five and six, but by ages seven and eight the differences by location are no longer enough to be statistically significant. The differences in scores based on period of attendance in the program are statistically significant for every age level in both locations. This seems to indicate that without much external reinforcement (as in Texas), children's progress in English is slower, but given access to a bilingual program they do eventually catch up.

It also shows that where strong community pressure toward the learning of English exists as in Washington state, that the effect of the bilingual program in the learning of English is magnified. However, attention should be called to the scores of children in the "no attendance" group in the North. These are scores of children whose schooling had been in non-bilingual programs up to the age in which they were tested for entry into IBI. Their previous schooling (at least that in Washington state) had been in classrooms where they were immersed in English. The children enrolled in the bilingual program have obviously far exceeded them in learning English. Informal observation suggests that when Spanish speaking children enter a traditional classroom where the teacher does not understand Spanish, that the children often become silent, and are not expected to respond by a teacher unable to communicate with them. Without practice they do not learn either Spanish or English very fast. With a bilingual teacher, communication is never lost--what is said in Spanish is understood and responded to, and the teacher is able to help the child rephrase the question or comment into English so that there is more language practice in both languages and more active learning. The result is significantly greater learning of English by children in the bilingual IBI program than for children in the no attendance group from traditional, English immersion classrooms.

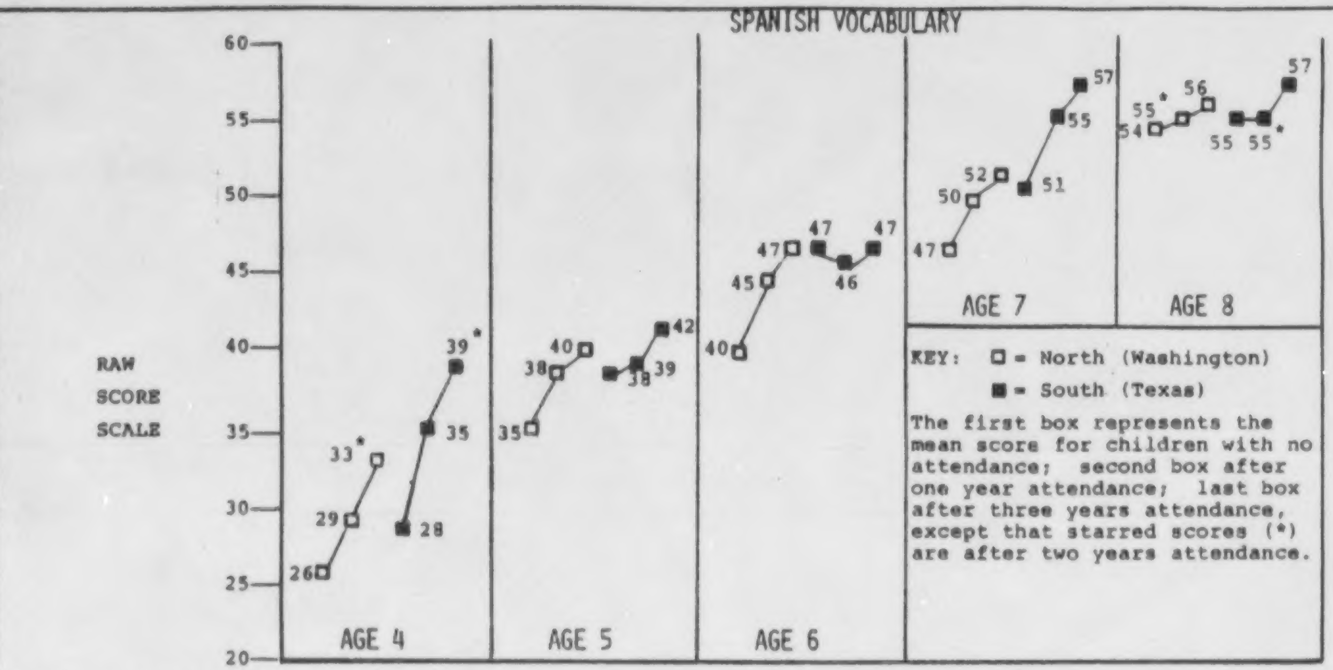
What are North/South differences in the learning of Spanish?

Figure 14 which follows shows the difference in scores in Spanish vocabulary in North and South sites. (As noted before, the children included in this analysis at both locations are those classified as primary language Spanish.)

As this Figure illustrates, with or without the program, the Spanish scores of children enrolled in Texas tend to be higher than Spanish scores of children in the North. However, the bilingual program seems to be more important in improving scores in Spanish for the children in the North who show a small but consistent increase based on longer periods of attendance, for every age level. The environment itself seems to support the Spanish of the children enrolled in Texas and attendance in the program not to make much difference except at the youngest age levels. When there is a strong pressure for language shift in a community the minority language is sometimes referred to as the "marked" language. These data suggest that a bilingual program is more important to maintain and develop the primary language when it is a "marked" language than when it is not.

Statistically the difference in scores, favoring Texas, is significant at every age level except age eight. Differences based on period of attendance in the program are significant at ages four and five but not for the older children.

It should be noted that in both the North and South children have maintained or improved their Spanish at the



The first box represents the mean score for children with no attendance; second box after one year attendance; last box after three years attendance, except that starred scores (*) are after two years attendance.

ANALYSIS OF VARIANCE FOR MAIN EFFECTS:	AGE 4	AGE 5	AGE 6	AGE 7	AGE 8
Location, Washington or Texas:	$F = 27.8^{**}$	$F = 5.1^{*}$	$F = 12.1^{**}$	$F = 5.3^{**}$	$F = 0.1$
Time Attended IBI:	$F = 15.7^{**}$	$F = 4.2^{**}$	$F = 1.3$	$F = 1.6$	$F = 0.3$

$^{*}p \leq .05$ (e.g., the difference between groups based on this variable is large enough to
$^{**}p < .01$ be statistically significant; at .01 the level of significance is higher than at .05)

DETAILED STATISTICAL ANALYSIS IS GIVEN IN TABLE 19 IN THE TECHNICAL APPENDIX.

FIGURE 14. MEAN RAW SCORES IN SPANISH VOCABULARY AS MEASURED BY FORM B (IN SPANISH) OF THE PEABODY PICTURE VOCABULARY TEST, BY LOCATION AND TIME OF ATTENDANCE IN THE PROGRAM

TO SUMMARIZE THE FINDINGS IN FIGURE 14:

1. AVERAGE SCORES IN SPANISH ARE CONSISTENTLY HIGHER IN TEXAS THAN IN WASHINGTON. WITH OR WITHOUT THE PROGRAM, CHILDREN'S SPANISH IS MORE DEVELOPED IN AN AREA WHERE IT IS THE LANGUAGE OF THE MAJORITY. THE DIFFERENCE FAVORING TEXAS IS STATISTICALLY SIGNIFICANT AT AGES FOUR, FIVE AND SIX, BUT BY AGES SEVEN AND EIGHT IS NO LONGER SIGNIFICANT.

2. CHILDREN IN THE NORTHERN SITES SHOW SMALL BUT CONSISTENT GAINS BASED ON PERIOD OF ATTENDANCE IN THE PROGRAM AT EVERY AGE LEVEL: GAINS BASED ON ATTENDANCE ARE LESS CONSISTENT FOR CHILDREN IN TEXAS. THIS MAY INDICATE THE PARTICIPATION IN A BILINGUAL PROGRAM MAY BE MORE IMPORTANT TO HELPING CHILDREN PRESERVE AND DEVELOP THEIR SPANISH IN THE NORTH, WHERE SPANISH RECEIVES LESS SUPPORT OUTSIDE THE PROGRAM THAN IN TEXAS.

3. DIFFERENCES IN SCORES BASED ON PERIOD OF ATTENDANCE IN THE PROGRAM ARE ONLY STATISTICALLY SIGNIFICANT AT AGES FOUR AND FIVE.

same time they have made very large gains in English, their second language.

To what extent is language shift taking place North and South?

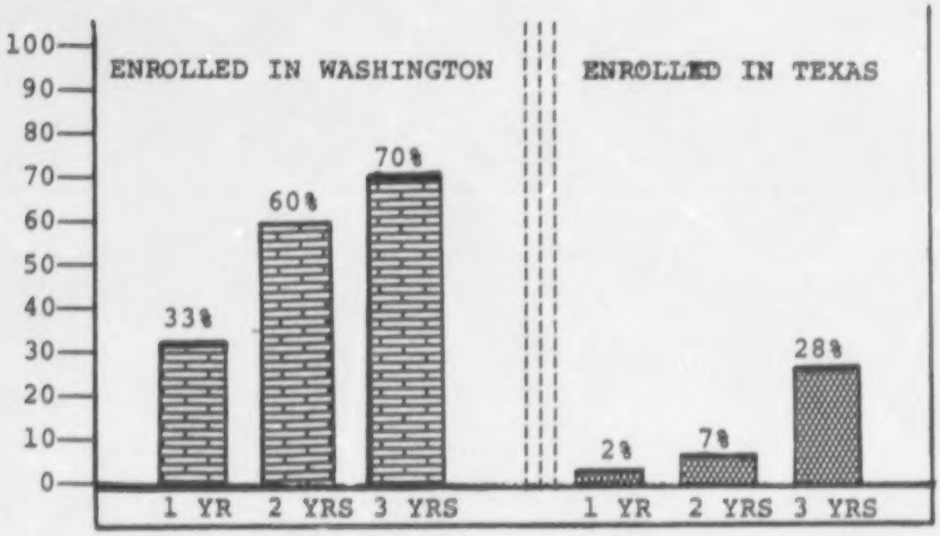
All of the children included in this comparative analysis scored higher in Spanish than in English in vocabulary tests when they entered the IBI program. After one year in the program some of the children had made larger gains in English than in Spanish so that English became the language in which they scored the highest. The percentage of children who tested higher in English than in Spanish increased with each added period of attendance, and to some extent occurred in both Texas and in Washington.

"Language shift" is more complex than can be measured simply by a comparison of vocabulary scores, but this measure provides at least an index of what is happening in the language children rely on and use in the school and home setting. Figure 15 shows the difference in pattern of language shift in terms of the percentage of children testing higher in English than in Spanish after different periods of time in the bilingual program as it operates in Washington and in Texas. The high percentages of children whose test dominance has changed to English in Washington state reflects both community attitudes and utility of English in this location; the relatively small percentage who have changed test dominance in Texas reflects the non-school usage which is almost entirely Spanish against the school usage of both languages.

It should be kept in mind that children have improved both Spanish and English through the bilingual program in both North and South, in keeping with the goals of the IBI program. The relative size of the gains undoubtedly represents an interaction between community factors and the bilingual program leading to the result of language shift in one location and not in the other.

CHANGE OF TEST DOMINANCE TO ENGLISH

(AMONG CHILDREN WHOSE FIRST LANGUAGE IS SPANISH)



Detailed statistical analysis is in Table 20 in the Technical Appendix.

FIGURE 15: PERCENTAGE OF CHILDREN ENROLLED BY SITE WHO TESTED HIGHER IN ENGLISH VOCABULARY THAN IN SPANISH VOCABULARY AFTER DIFFERENT PERIODS OF ATTENDANCE IN THE IBI PROGRAM.

TO SUMMARIZE THE FINDINGS IN FIGURE 15:

1. IN THE NORTHERN SITES WHERE SPANISH IS THE LANGUAGE OF THE MINORITY, MANY MORE CHILDREN WHOSE FIRST LANGUAGE IS SPANISH SWITCH TEST DOMINANCE TO ENGLISH THAN IN TEXAS IBI SITES, WHERE SPANISH IS THE MAJORITY LANGUAGE OF THE COMMUNITY.

What are North/South differences for IBI children in learning math?

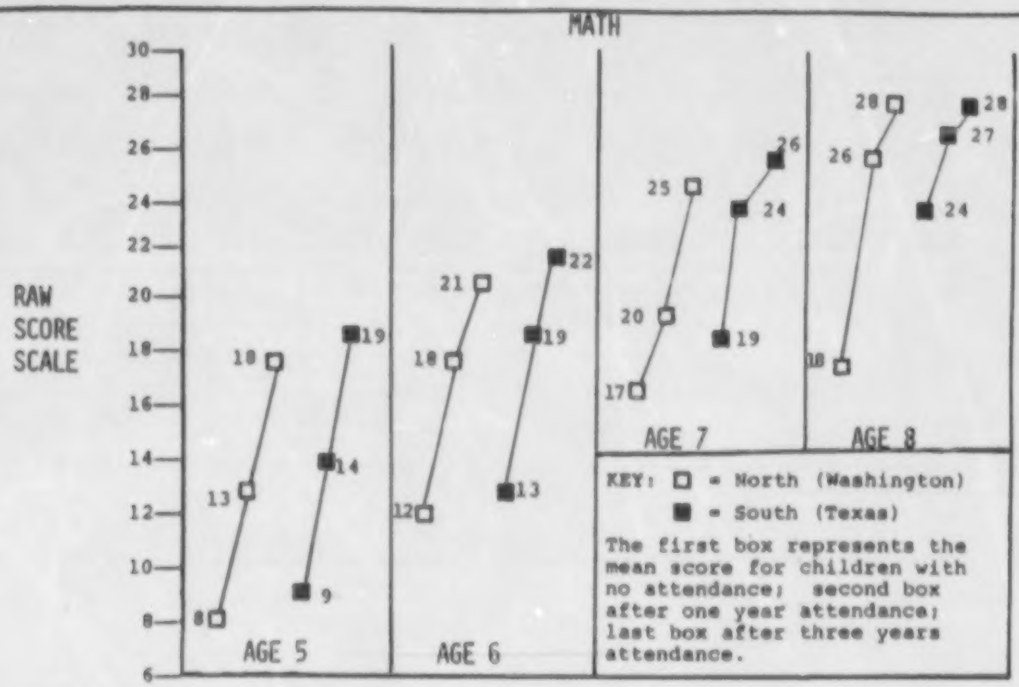
Figure 16 illustrates a similar pattern of gains in math scores for children in the North and South IBI programs. In each case a very significant increase in scores occurs with each added period of attendance in the program. At every age level the effect of attendance in the program produces differences that are highly significant.

There is another pattern illustrated in Figure 16 which is a slight superiority in math for children in Texas when they enter the program (no attendance group), and this slight superiority for Texas children is maintained after comparable periods of attendance in the IBI program. The result is that differences in scores based on whether children are enrolled in the Texas or in the Washington programs are large enough and consistent enough favoring Texas to be statistically significant at every age level.

As shown earlier in this report, the children in Texas also showed a consistent superiority in Spanish over the children in Washington. This relationship between greater competence in the primary language and greater competence in math is consistent with other studies on the relationship between first and second language competence and skill in math. (See references at the end of the Technical Appendix.) These data at least suggest that the process of language shift which is much more intensive for children in the northern sites, is somewhat detrimental to the learning of math. Overall, however, the gains in math at both sites brought about through longer periods of attendance in the IBI program greatly overshadow the differences based on location.

What are North-South differences for IBI children in learning English reading?

Figure 17 shows the pattern of reading gains by children in the North and South after differing periods of attendance.



ANALYSIS OF VARIANCE FOR MAIN EFFECTS:

	AGE 5	AGE 6	AGE 7	AGE 8
Location, Washington or Texas:	$F = 5.1^{*}$	$F = 7.2^{**}$	$F = 8.9^{**}$	$F = 11.4^{**}$
Time Attended IBI:	$F = 43.5^{**}$	$F = 30.5^{**}$	$F = 14.8^{**}$	$F = 10.5^{**}$

$^{*}p < .05$ (e.g., the differences between groups based on these variables are large enough to be statistically significant; at .01 the level of significance is higher than at .05)

$^{**}p < .01$

DETAILED STATISTICAL ANALYSIS IS SHOWN IN TABLE 21 IN THE TECHNICAL APPENDIX.

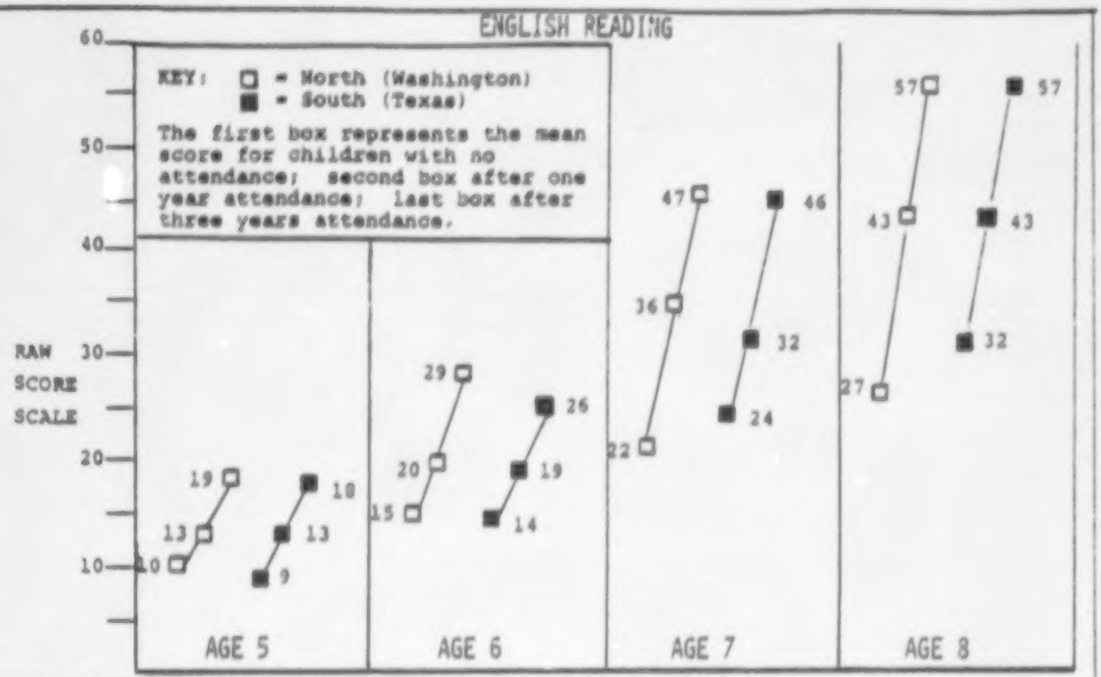
FIGURE 16. MEAN RAW SCORES ON THE MATH SUBTEST OF THE WIDE RANGE ACHIEVEMENT TEST, BY LOCATION AND TIME OF ATTENDANCE IN THE IBI PROGRAM

TO SUMMARIZE THE FINDINGS IN FIGURE 16:

1. THERE IS A SMALL BUT CONSISTENT SUPERIORITY IN THE AVERAGE SCORES OF CHILDREN IN TEXAS BEFORE THEY ENTER THE PROGRAM (NO ATTENDANCE GROUP), WHICH IS MAINTAINED AFTER COMPARABLE PERIODS OF ATTENDANCE. (SEE THE NARRATIVE FOR DISCUSSION OF RELATIONSHIP BETWEEN MAINTENANCE OF PRIMARY LANGUAGE AND MATH SKILLS, AND EFFECTS OF LANGUAGE SHIFT ON LEARNING MATH.)

2. THE DIFFERENCE IN MATH SCORES FAVORING TEXAS IS CONSISTENT ENOUGH SO THAT NORTH/SOUTH DIFFERENCES ARE STATISTICALLY SIGNIFICANT AT EVERY AGE LEVEL.

3. LONGER PERIODS OF ATTENDANCE IN THE PROGRAM PRODUCES LARGE GAINS IN MATH SKILLS FOR CHILDREN ENROLLED IN BOTH LOCATIONS.



ANALYSIS OF VARIANCE FOR MAIN EFFECTS:	AGE 5	AGE 6	AGE 7	AGE 8
Location, Washington or Texas:	F = 0.5	F = 0.3	F = 0.2	F = 0.5
Time Attended IBI:	F = 27.7**	F = 18.2**	F = 13.3**	F = 21.9**

** $p < .01$ (e.g., the differences between groups based on this variable are large enough to be statistically significant)

DETAILED STATISTICAL ANALYSIS IS GIVEN IN TABLE 22 IN THE TECHNICAL APPENDIX.

FIGURE 17: MEAN RAW SCORES ON THE READING SUBTEST OF THE WIDE RANGE ACHIEVEMENT TEST, BY LOCATION AND TIME OF ATTENDANCE IN THE IBI PROGRAM.

TO SUMMARIZE THE FINDINGS IN FIGURE 17:

1. THERE IS A VIRTUALLY IDENTICAL PATTERN OF READING SCORES FOR CHILDREN ENROLLED IN THE NORTH AND IN THE SOUTH, AND THE STATISTICAL ANALYSIS CONFIRMS THAT THERE ARE NO SIGNIFICANT DIFFERENCES BASED ON LOCATION FOR ANY AGE LEVEL.
2. ATTENDANCE IN THE PROGRAM PRODUCES VERY LARGE GAINS IN READING SCORES IN BOTH LOCATIONS, AND THE DIFFERENCES BETWEEN GROUPS WHO HAVE ATTENDED FOR DIFFERENT PERIODS OF TIME IS HIGHLY SIGNIFICANT AT EVERY AGE LEVEL.

(SEE NARRATIVE FOR DISCUSSION OF RELATIONSHIP BETWEEN ENGLISH READING AND ENGLISH VOCABULARY SCORES.)

This shows a virtually identical pattern of test scores, and the statistical analysis reported under each age level confirms this; there are no significant differences in reading scores related to whether the child is enrolled in Texas or in Washington state.

On the other hand, it shows that attendance in the IBI program is enormously beneficial in raising reading scores in both locations; the differences between groups based on how long they have benefited from attendance in the IBI program is statistically highly significant for every age level in both locations.

Since the vocabulary test scores showed a much higher vocabulary in English, particularly within the first year of attendance, in Washington state programs, there might have been an expectation of higher English reading scores in Washington. In general this is not the case. This seems to indicate that children can learn to read in English (particularly in materials where the introduction of new vocabulary is controlled as it is in the Sullivan reading series used by IBI) before their overall vocabulary in English is very large, and before they use English as a preferred language of communication. This is not uncommon with adults, many of whom can read another language but do not feel they can use it conversationally.

This evidence would be stronger with the use of another reading test which included a section specifically on comprehension. The WRAT test measures decoding skills, raising the question of whether children also understand words that they can pronounce. However, the IBI program uses a mastery learning format so that built in to the teaching of reading the teachers have been trained to check comprehension and this is a continuous process. The program also has internally developed mastery tests geared to the curriculum. Both teacher judgment and these curriculum related tests indicate that children in both locations are reading with comprehension. Teachers in Texas have noted that some children, who do not voluntarily ever use English when they speak, are able to read it and demonstrate complete comprehension of what they have read. The teachers in Texas feel that through reading children are learning much more English than if reading had been postponed until some level of vocabulary development indicated that children had developed "an oral base" in English.

Since the children are taught by bilingual teachers it is possible to use Spanish whenever necessary as they work on reading, to assure that the children understand what it is they are reading. It is possible that Spanish speaking children introduced to reading in English in a classroom where the teacher could not use Spanish to communicate meaning to them would learn to pronounce words without comprehension.

What conclusions can be drawn from this pattern of differences of scores in English and Spanish and in math and reading between the "transitional" northern community and the "maintenance" border Texas community served by the IBI programs?

This comparative analysis provides at least a partial answer to the question: Will children make faster academic progress if they are maintaining their primary language or making a transition to their second language? The test scores reported indicate that children at both locations are maintaining Spanish, but the children in the North are making the transition to English much faster. Supporters of transitional bilingual programs might make the assumption that faster gains in English would go hand in hand with faster gains in academic subjects. The comparative data from the IBI programs do not seem to support this. The children in Texas are making somewhat better academic progress than the ones in Washington State. Reading scores were about equal in the North and in Texas, and there was a clear superiority in math achievement favoring Texas.

Another conclusion drawn from the comparative analysis is that there appears to be significantly faster gains made in English in communities where socioeconomic factors promote transition than in communities where these same factors support maintenance of Spanish. Since there is a much greater mix of language facility among children enrolling in the northern programs than in Texas, it means that Spanish speaking children will hear much more English. The teachers in the Washington centers also indicated more use of English at home than those in Texas, and most felt that they spoke English as well or better than Spanish which was not reported among teachers in Texas. This undoubtedly accounted substantially for differences in relative English gains, plus whatever language exposure the child encountered outside the classroom. Before one draws the conclusion that more exposure adds up to more progress in English, it should be noted that the children in the baseline group in the North, whose educational progress reflected almost entirely English-only classrooms, did not make nearly the progress in learning English that children made in the IBI bilingual program. The structured teaching of English in the bilingual program, and the combination of use of the languages appears to have facilitated learning English much more than the conventional "immersion" classrooms experienced prior to entry to IBI.

Another conclusion drawn from this comparative analysis is that the child's development in the two languages appears to be somewhat independent. Children in the northern centers appear to maintain at least a receptive vocabulary in Spanish even in a "transitional" community, even though they have made very large gains in English. This is contrary to the "balance effect" hypothesis, which projects a loss in primary language to balance the gain in the second language. Conversely, the children in Texas who did not gain as much English, did not show an offsetting large gain in

Spanish--there may have been a ceiling effect with the test that was used and not a great deal of room for gain at either location.

In looking at the comparative data it is striking that the scores of children in the two locations are more alike than they are different; that in both cases they represent enormous gains over the expected achievement level as measured by the scores of the "no attendance" group. This at least bears on the issue that has been raised as to the relative importance of an educational program, per se, in producing academic gains, and the importance of community attitudes, linguistic acceptance, and other socioeconomic factors in affecting children's academic progress. The educational program itself appears to be primarily responsible for the gains children have made, and capable of producing similar results even when there are great differences in the status of the minority language in given communities.

The final conclusion bears on the comparative advantage of English "immersion," or English as a second language (ESL), or bilingual education. From the academic scores presented it is clear that children were making very large gains in academic areas at ages when the charts for vocabulary development showed them still lagging far behind in English as compared to their scores in Spanish. It would thus appear that given access to bilingual instruction, it is possible for children to keep up with academic skills showing normal progress, even while their English skills are very deficient. Had they been put into a program in which the concentration was solely upon improving English (ESL) with the children left to cope with academic instruction as best they could until their English was developed enough to enable them to use only English as a medium of instruction, the long period required to reach an acceptable level of English would have been a serious handicap. It would appear that bilingual instruction is much superior to putting children on "hold" in academic subjects until they can learn English.

Because the "no attendance" group used in the IBI evaluation represents progress of children whose prior educational experiences represented a variety of classroom approaches, the evidence presented cannot be interpreted as clearly favoring bilingual over traditional classrooms using "immersion" in English. However, the data from the northern site might be interpreted that way--the children who entered the IBI program in the North had no access in public schools to anything except "immersion English" in those communities unless they had encountered it in other states before moving to Washington. The IBI program also cannot be interpreted as representative of "bilingual" education--it is sequential, structured, well monitored, staff are given a great deal of training, it uses various classroom management techniques that have been associated with other non-bilingual successful educational programs. It can be said that given a well run bilingual program, children who are in most circumstances rock bottom low in academic and language skills are capable of making enormous progress. And it does seem important to add that this kind of result can be obtained utilizing a readily available teaching resource--bilingual adults from the same families as the children served.

FOLLOW-UP STUDY

DOES PARTICIPATION IN THE IBI PROGRAM AFFECT ACADEMIC PERFORMANCE AT UPPER GRADE LEVELS AFTER CHILDREN ARE NO LONGER ENROLLED?

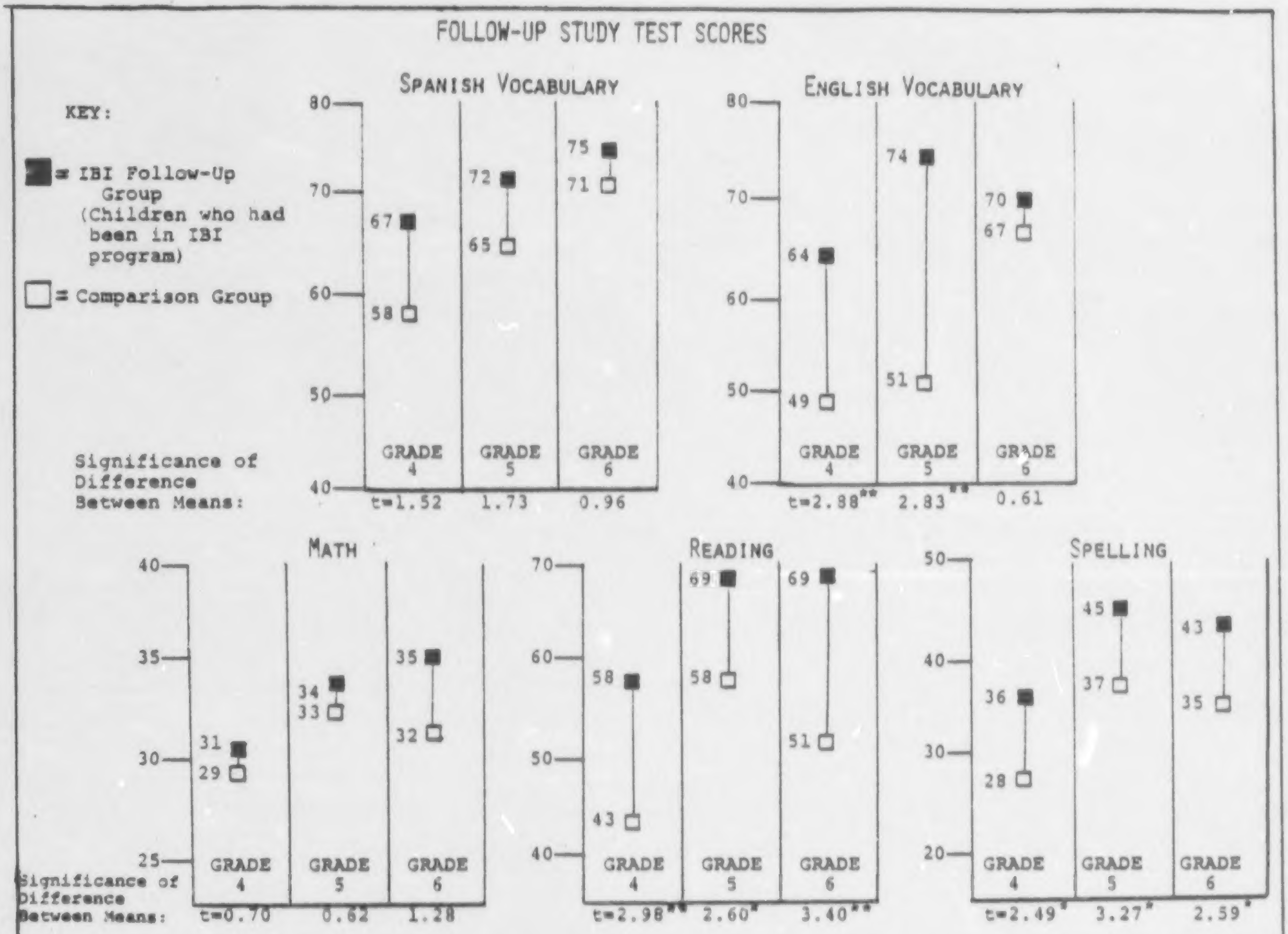
One more special study was added to the evaluation design this year to follow up on children in fourth, fifth and sixth grade to see if participation in the IBI program at a younger age had produced a lasting effect in academic performance.

The study was carried out at the Texas site because arrangements had already been made there for testing migrant children in a school in a neighboring community, and it was possible to extend this agreement to allow testing of children at the upper grade levels.

The sample of children from the IBI program included all children in the fourth, fifth or sixth grade who had been enrolled in the IBI program for a period of at least 250 days (equivalent of one and a half school years). Their attendance could have been at any period, preschool through third grade, and the sample included children who had been out of the IBI program anywhere from one to five years.

For this report analysis was limited to comparing the mean raw scores in five tests between former IBI children, and the comparison group of the same grade level. Statistical analysis was done to see if the differences between the means for children of the same grade level on each of these tests was large enough to be statistically significant. The tests included Spanish and English vocabulary, English reading and spelling, and math.

Results of the follow-up study are presented in Figure 18 which follows. At every grade level for each of these



*p < .05 (e.g., the difference between means of the IBI follow-up and the comparison
**p < .01 group of the same grade level is large enough to be statistically significant; p < .01 being a higher level of significance than p < .05)

DETAILED STATISTICAL ANALYSIS IS GIVEN IN TABLE 23 IN THE TECHNICAL APPENDIX.

FIGURE 18: MEAN RAW SCORES BY GRADE LEVEL FOR IBI FOLLOW-UP CHILDREN AND A COMPARISON GROUP, IN SPANISH AND ENGLISH VOCABULARY USING THE PEABODY PICTURE VOCABULARY TEST, AND IN ENGLISH READING AND SPELLING AND MATH USING THE WIDE RANGE ACHIEVEMENT TEST

TO SUMMARIZE THE FINDINGS IN FIGURE 18:

1. THE FOLLOW-UP GROUP OF CHILDREN DEMONSTRATE HIGHER SCORES THAN THE COMPARISON IN BOTH SPANISH AND ENGLISH VOCABULARY. THE DIFFERENCES IN SPANISH ARE NOT ENOUGH TO BE STATISTICALLY SIGNIFICANT. IN ENGLISH VOCABULARY THE DIFFERENCES ARE STATISTICALLY SIGNIFICANT AT GRADES FOUR AND FIVE, NOT FOR GRADE SIX. THROUGH THE BILINGUAL PROGRAM THE IBI CHILDREN DEVELOPED ABOUT AN EQUAL LEVEL OF SKILLS IN SPANISH AND ENGLISH, WHILE THE COMPARISON GROUP CHILDREN LAG RATHER FAR BEHIND IN ENGLISH AT LEAST UP TO THE SIXTH GRADE.
2. IN BOTH ENGLISH READING AND SPELLING, THE IBI FOLLOW-UP CHILDREN HAVE MUCH HIGHER SCORES THAN COMPARISON CHILDREN, AND THE DIFFERENCES ARE STATISTICALLY SIGNIFICANT AT EVERY GRADE LEVEL.
3. IN MATH, THE IBI FOLLOW-UP GROUP IS SUPERIOR TO THE COMPARISON GROUP AT EACH GRADE LEVEL, BUT THE DIFFERENCES ARE NOT ENOUGH TO BE STATISTICALLY SIGNIFICANT.
4. OVERALL IT APPEARS THE IBI PROGRAM HAS HAD THE LEAST LASTING BENEFITS IN SPANISH VOCABULARY AND IN MATH, WHERE ENGLISH LANGUAGE SKILLS ARE LEAST IMPORTANT; THAT IS, IT HAS HAD THE MOST LASTING BENEFIT IN ALL AREAS DEPENDENT UPON DEVELOPING SECOND LANGUAGE SKILLS IN ENGLISH.

tests the follow-up group of IBI children scores higher than children in the comparison group who had not had the benefit of such a program. It therefore does appear that there is a lasting effect from participation in an early childhood bilingual program, and that the effects are measurable at least through the sixth grade.

Statistical analysis of the differences in scores is shown below the grade level in each of the tests, with one or two asterisks to indicate if the difference in scores was significant. No asterisks indicate that the differences are not statistically significant.

As shown in Figure 18, participation in the IBI program seems to have had the least lasting effect in Spanish vocabulary and in math. Although the IBI follow-up children consistently score higher in each of these areas than the comparison group, the differences are not enough to be statistically significant.

All academic areas related to a higher proficiency in English do show a lasting effect. In both reading and spelling, the superiority of IBI follow-up children is statistically significant at fourth, fifth and sixth grade levels. In English vocabulary the superiority is significant at fourth and fifth grades, but not at the sixth grade level.

The size of the sample of children in the follow-up study was small, and it appears there may be some distortion because of the small sample since in some instances the level of scores is lower at sixth grade than at fifth grade. This could mean there were a disproportionate number of high ability children in the fifth grade or of low ability children at the sixth grade. The overall pattern, however, does appear clear. The IBI program has greatly increased children's competency in English and this has resulted in lasting and statistically significant academic benefits in all test areas related to English language skills.

STAFF DEVELOPMENT TRAINING

1. ARE TEACHERS RECEIVING IN-SERVICE TRAINING?

THE IBI TRAINING PROCESS: In the early years of the IBI program some systematic variations in training methods were tried. One of these compared teacher effectiveness for teachers who had an extended period of preservice training during which time they did not have primary responsibility for a group of children, and for other teachers who had an assigned group from the first week of employment. The in-service training model was more effective--the teachers seemed quicker to pick up teaching skills when they had primary responsibility for a group of children.

The early training also used variations of "generalized" training--i.e., skills such as how to get children to ask questions or make longer responses that might apply across several subject areas, as opposed to very focused training specific to a given curriculum. An example of focused training would be showing teachers how to give specific feedback when they are marking children's handwriting work papers so they can be sure the child knows what he has done right or wrong. Again, it was found that the focused training specific to each curriculum area was much more effective.

As a result, IBI uses in-service training, very specific to the curriculum materials. A five-step training process is used. The first step begins with the trainer demonstrating the teaching skills (demonstrations proved a much quicker method to train than discussions about what to do). The next step is a "pre-observation" in which the teacher is working with a group of children and the trainer watches (without taking notes) and steps in and models how to do it if there is something the teacher doesn't understand how to do.

The third step in the training process is a scheduled observation in which the trainer writes down actual interactions between teachers and children, following an observation form that covers all the essential teaching skills in that subject area. After an observation the trainer goes over the record with the teacher and makes suggestions. When two or more observations have been completed, a checklist is filled out indicating if each teaching skill can be consistently demonstrated by the teacher. Going over this with the teacher serves as a summary and review of the training unit. The checklist has a criteria for passage of the training unit (a percentage of skills that must be marked plus for "consistently demonstrates," and some skills that are considered mandatory for successful teaching of that particular subject). The final (fifth) step in the training process is going back after three or four months with a monitoring unit to record what teachers are doing and see if the essential skills are still being carried out by the teaching staff.

PROJECT RESULTS: A total of 44 different teachers were employed in the IBI program (there was an unusual amount of staff turnover in the 1979-80 year so that many of these were employed for a short time--at any one time the teaching staff would be 22 to 26 teachers).

Of these, 59% received continuous in-service training that approximated the project goal of one unit completed for each two months. Of the remaining 41%, all received some in-service training, but it was intermittent, and less than the amount set by the project as a goal.

The goal for in-service training was that at least 80% of the staff would receive in-service training at the scheduled rate. As reported, this goal was partially met. The project did as well as it could with training resources given it, which were cut in half for the 1979-80 program year (originally scheduled to be the termination year for the IBI program. Subsequently, IBI has applied for and received funding as a demonstration program for an additional three year period.)

To some extent the project "coasted" on previous training effort, deliberately reducing the monitoring aspect of training used to maintain skills with experienced staff, in favor of concentrating attention on new staff. The project also had to divert some training time to helping other school districts who are attempting to adopt one or more components of the IBI program. Since IBI had been funded originally as a demonstration, it felt that when the demonstration was successful and other educational agencies sent people to IBI to be trained or asked for help at their site for training a large number of teachers who would be using the IBI model, that this should be given as much priority as possible.

2. ARE STAFF RECEIVING CONTINUED ACADEMIC TRAINING?

THE IBI ACADEMIC TRAINING PROGRAM: In the past, IBI has worked out arrangements with colleges through which most of the full-time staff was able to take either GED training, or college classes, often completing several credits of academic work each year. In most cases this academic work has been given as off-campus credits. Course outlines are submitted to the institution for approval; IBI has used its own training staff or hired a teacher who was approved by the college, and provided the classes at times and in locations that made it possible for teachers working full-time to get college credit. In other cases, IBI has transported teachers to classes in which they were only part of the class, with other students. Many staff members have received enough academic credit to receive a one-year college certificate, and some have nearly completed the associate of arts degree.

PROJECT RESULTS: Nine teachers were enrolled for college credits during the 1979-80 program year. This represents a greatly diminished academic continuation program from previous years, and is far short of the project goal that 80% of the full-time teaching staff would continue academic work. However, in the negotiated budget for the 1979-80 year, the funding for college credits or other academic services was at first eliminated entirely, and was finally restored in a token amount. Priorities had to be set to determine which teachers would receive the limited help available. For example, IBI accepted two Down's Syndrome children (whose families were Spanish speaking). Since the needs of these children went beyond IBI training, the teacher assigned to work with them was given the opportunity to attend two classes on working with handicapped, and a workshop specifically on Down's Syndrome. Some teachers who were nearing a degree or certification goal were given an opportunity to attend classes. And some who felt their Spanish was deficient were enrolled in Spanish classes. In this way, the project made the best use it could out of the limited funding, and the goal would be considered "partially met".

3. ARE TRAINING STAFF BEING SYSTEMATICALLY TRAINED?

THE IBI PROGRAM TO TRAIN TRAINERS: The IBI program has worked out a very thorough trainer training program. It covers all the skills that must be demonstrated in reference to the program's teacher training; it also covers the rationale behind the teaching strategies. From this, trainers have both the theoretical and the practical aspects of the program available to them. There are quizzes with a criteria for passing to check the background knowledge. There are also demonstration observation forms which require the trainer to demonstrate the skills, again meeting a criterion level. Trainers are also checked on their skills in doing observations, giving feedback and conferencing teachers.

PROJECT RESULTS: One trainer completed the trainer training program, meeting the criteria. (She subsequently resigned for personal reasons. Her replacement was partially trained, and then also resigned.) IBI carried forward some staff trained in previous years, and by and large did not have funding to fill vacancies in the training staff because of budget cuts. The trainer training program was used to assist other school districts to train personnel who would supervise an adoption site.

PARENT AND COMMUNITY INVOLVEMENT COMPONENT

1. ARE PARENTS INVOLVED IN DECISION MAKING?

PARENT AND COMMUNITY INVOLVEMENT IN THE IBI PROGRAM: In order to assure that the program operations best meet the needs of the participants, and that the resources of the community are integrated into the program, each community in which the IBI program operates has an organized parent/community advisory council.

In the two Washington State sites, all parents of children enrolled in the program are members. They, in turn, elect officers as well as official representatives of the community. Each group has written bylaws and meets approximately monthly throughout the year.

In Texas the parents' group chose to incorporate. Instead of officers they elect a five-member board made up of parents and members of the community, with the project educational director serving as its executive officer. During the mobile phase, when La Grulla residents have mostly moved north to various locations doing seasonal farm work, if official business needs to be taken up, the educational director and/or site coordinator for the Texas site contacts board members by telephone, and business is conducted in this manner.

In addition to the five-member board, however, the Texas site holds general meetings of parents in order to discuss center operations, proposals, etc. During the northern phase when mobile centers are operating at temporary sites, the site-coordinator may hold a series of meetings at the labor camps or at the preschool centers where IBI children are served.

In order for parents to have information on the project from which to make decisions, all staff report to the parent groups. Each published evaluation is submitted to parent/

community advisory groups for review. The trainer and some teachers as well as the site coordinator usually attend all meetings to report on how the program is doing. Usually once or twice during the year some teachers will do a curriculum demonstration for the parents, and sometimes videotaped lessons are shown. The project manager is responsible for submitting outlines of plans that would go into proposals for advisory group discussion and review prior to submission of any funding proposal.

Parents in the IBI program have more than an advisory relationship to the program. A personnel committee of parents and staff screens and recommends teachers, cooks and other support personnel to be hired. Although the board of the administering school district has the final authority on hiring, the local screening committee's personnel recommendations have always been honored so that in fact the parent committee has a primary role in hiring. In addition, the parent groups have been able to earn substantial funds (several thousand dollars over the years) through voucher payment for volunteer services and various fund raising projects. They have sole authority over use of the parents' funds. A number of different projects have been developed for the benefit of members using parent funds.

PROJECT RESULTS: The project goal in regard to parent/community advisory groups was that in each site they would participate in program decisions in at least four out of five areas. The areas of decision making were: (1) Organizational matters -- handling the business of the advisory group (electing officers, setting meeting times, etc.) including carrying out special projects; (2) Reviewing and having input into funding proposals; (3) Participating in personnel decisions including serving on screening committees for filling staff vacancies; (4) Making decisions about collection and use of parent funds; and (5) Making decisions about the educational program (hours of operation, curriculum decisions, inclusion of cultural activities, etc.).

Figure 19 which follows is a content analysis from the minutes of Parent-Community Advisory Board meetings in the three sites, showing action taken in the five specified areas. The Boards are very active in decision-making roles concerning the program, and this goal was met at all sites.

2. HAVE PARENTS PARTICIPATED IN PROGRAM EVALUATION?

MEANS OF PARENT EVALUATION OF THE IBI PROGRAM: The IBI program has developed a process whereby parents come to the center, are given explanations about the curriculum and teaching methods by the trainer and sometimes by teachers, and then parents spend time observing and filling out an observation form as they watch each subject area being taught. They are to comment on such things as how much encouragement the teacher gives, how interested and involved in learning they find the children, what they see about children's progress from wall charts and from looking through workbooks and simply from watching children responding in the class. There are places on the form for more general observations and suggestions.

The parents can fill out these forms in Spanish or in English, or if they choose they can tell their responses to the trainer or site coordinator who will help write out their comments. The centers have handled this parent evaluation process in different ways. In the northern centers the advisory committee usually requests volunteers or appoints a committee of three or more parents who do this evaluating. In Texas, staff has tried to contact every parent. They explain the program as they visit in the home, and then parents fill out the evaluation form when they visit the center. It is used there as a means of teacher/

parent contact as well as an evaluative purpose.

In addition, the published evaluations of the program are sent to the chairman of each parent/community advisory board, and staff assist in presenting the evaluation information to parents. Quite frequently, the Board chairman will write comments on the program, and often asks parents also to write lettersabout the program.

PROJECT RESULTS: The evaluator has a file of parent evaluations and letters coming from every site indicating that parental review is an ongoing process. The IBI parental review form elicits more specific information and suggestions than the letters, which tend to be testimonials of appreciation. Review of the minutes also indicates that there are frequent reports on various aspects of the program made by staff to the parent group, and a yearly review of all the program goals that goes into discussion and acceptance of the funding proposals.

CONTENT ANALYSIS OF ADVISORY COMMITTEE MEETINGS

MOSES LAKE	CONNELL	LA GRULLA
(a) Organizational matters (e.g, setting meeting times, voting for officers, planning parent activities, etc.)		
3/80 Plan elections 4/80 Hold elections	10/79 Elect Rep. to attend meetings in Yakima 4/80 Announce officers following mail vote 5/80 Plan work day	10/80 Discuss problem of getting quorum because officers not back from migration, set temporary procedures for hiring.
(b) Review and input into funding proposals		
6/80 Review and approve proposal; input on Spanish reading	6/80 Discuss and approve Title VII proposal	6/80 Discuss plans for 80-81 IBI program, approve proposal
(c) Interviewing and selection of teaching staff as well as other personnel actions		
3/80 Screen 2, select 1 for Asst. Coord. 6/80 Screen 2, select 1 for teacher trainee 7/80 Screen 1, reject same for teacher 7/80 Select teacher from previous screening	10/79 Screen 2, select 1 for teacher trainee 11/79 Screen 1, select 1 for teacher trainee 4/80 Screen 5, select 2 for teacher trainee	10/79 Discuss hiring handicap recruiter, arrange for same. Reinstate teacher. 10/80 Temporary hiring procedures set up
(d) Decisions regarding raising and using parent funds		
7/80 Decision to assess members for $1700 needed to fix bus	9/79 Discuss fees 4/80 Decision to use parent funds to install lawn	
(e) Decisions regarding hours of operation, curriculum and other aspects of educational program		
6/80 Decide how to handle transportation; makesplans to clean up volcanic ash. Discuss Spanish reading; have demonstration of language curriculum	6/80 Parents evaluate educational program, letters of approval	9/79 Plan physical exams, discuss staff-child ratio and need for two more teachers. 12/79 Plan Christmas party

FIGURE 19: PARENTS PARTICIPATION IN DECISION MAKING BASED ON MINUTES FROM PARENT/COMMUNITY ADVISORY GROUPS AT EACH IBI SITE.

MATERIALS DEVELOPMENT COMPONENT

1. HAVE PROJECT TRAINING MATERIALS BEEN ADAPTED FOR USE BY OTHER EDUCATIONAL AGENCIES?

FINDINGS: IBI has found that when other educational agencies want to adopt one or more components of the IBI model (each curriculum area is considered a component) that frequently some adaptation has to be made. At the IBI "home" sites, training usually takes place with only a small number of teachers at a time, quite often only one, as teachers are hired at different times and are at different points in the training sequence. At most adoption sites, the school wants to prepare teachers in a two-day period to carry out the teaching methods needed to implement a particular curriculum. This training session is likely to involve a large number of people, teachers and aides, sometimes parents and administrators and resource staff. IBI has therefore had to work out a revised presentation method to use at these intensive pre-service training sessions. IBI also provides two follow-up visits to a first year adoption site, and once again has had to devise somewhat different forms to use for observing teachers on these follow-up visits because the amount of contact possible is much less than in the ongoing inservice training for IBI staff.

These adaptations have been made and are in use at adoption sites using the English language curriculum, Spanish language curriculum, handwriting curriculum, math curriculum, reading curriculum, and preschool curriculum. This goal was therefore met.

DISSEMINATION COMPONENT

HAS IBI MADE ITS PROGRAM AVAILABLE TO OTHER USERS?

For about four years, the U.S. Office of Education has been trying to develop a support system so that effective programs can be adopted by other school districts, thereby disseminating effective educational practices. They found that curriculum models could not simply be "packaged" and sent as written materials to another site; that installing a program at a new site often required personal assistance from people who had used it at the site where it was developed. IBI, as a nationally validated program, has been a part of this process. It receives a small supplemental grant to pay for travel to other states to present information about the program to interest potential users. When a school district makes the decision that it wants to "adopt" the program, IBI works out an adoption agreement. IBI agrees to provide two days of training per component adopted (as a minimum), and to provide two follow-up visits during the "start-up" year. The adopter agrees to follow the IBI model in curriculum selection, methods, training, scheduling, etc., and to evaluate to see if the program is effective for them.

The first year into dissemination was spent mainly on getting materials ready so another program could use them. IBI got one adoption. The second year it got seven more adoptions. The goal for the 1979-80 year was at least six additional adoptions. As there were ten new adoptions, this goal was met. Figure 20 shows the location of IBI adoptions (now grown to 20) in 17 cities, in 6 states.

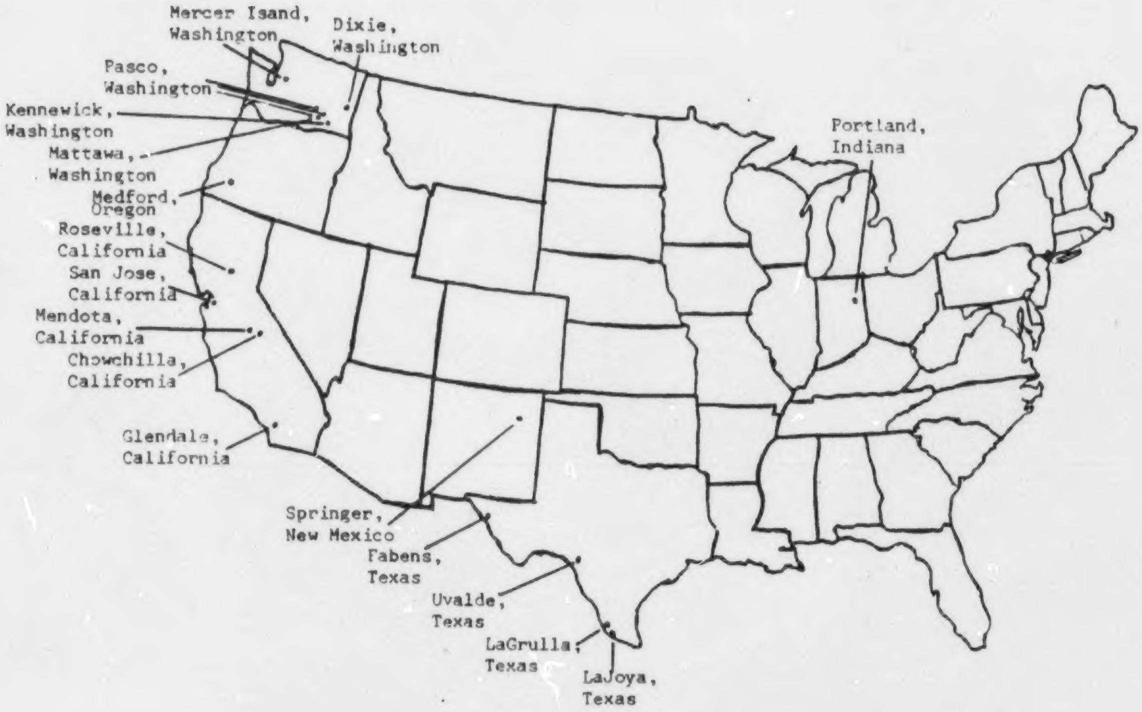

Mercer Isand, Washington
Dixie, Washington
Pasco, Washington
Kennewick, Washington
Mattawa, Washington
Medford, Oregon
Roseville, California
San Jose, California
Mendota, California
Chowchilla, California
Glendale, California
Springer, New Mexico
Fabens, Texas
Uvalde, Texas
LaGrulla, Texas
LaJoya, Texas
Portland, Indiana

FIGURE 20: LOCATION OF ADOPTIONS OF THE IBI PROGRAM AS OF 1980

TECHNICAL APPENDIX

The main body of this report was written for the general reader, and for clarity avoided technical detail. Since information on procedures for testing and data collection and explanatory footnotes for the analysis of test scores in the instructional component is of importance to a technical reader, that information has been reported here.

TESTING AND DATA COLLECTION AND ANALYSIS PROCEDURES

Training of Testing Personnel

Independent testers are used at each site--e.g., instructional or supervisory staff do not do testing. All testers are paraprofessional bilingual Mexican-Americans. Since more than 95% of the children served are Mexican-American, this testing staff has cultural identity for the overwhelming majority of children being tested.

Each tester is individually trained on each instrument and must demonstrate appropriate procedures in the testing of at least two children, under observation, as part of the training. Subsequent monitoring visits review testing procedures annually. Training and monitoring of testers is done by the evaluator and/or the resource trainer. Experienced testers are also used to assist in training new testers.

Testing Schedule

All children are pretested before attending the program for 30 days--in practice as soon as possible after their initial enrollment. This pretesting includes all of the instruments used in the evaluation appropriate to children of their age. It also includes the project achievement tests which are used to help determine initial placement of children in project materials. The IBI program serves children continuously over the 12 months of the year. Since new children can and do enroll in the program every month during the year, pretests are also given during every month throughout the year.

Repeat testing on standardized test instruments is done after an individual child has attended for a period of 100 days, i.e., the child is tested at 100, 200, 300, etc. days. Attendance data are kept individually for each child and at the end of each month a list is made of every child who that month passed a testing interval in his attendance. This list is forwarded to the tester at each site who then administers the appropriate tests for that child. Every month some children at each center reach a testing point in their program attendance, so post-tests are also given during every month throughout the year.

Rationale for Testing Schedule

This testing schedule is more complicated than the usual evaluation procedure of doing mass testing at two calendar points. It was devised because of the unique requirements of evaluating a migrant population who have spotty attendance and who come and go at different times during the year. When the Texas Education Agency reports on child progress between tests administered in October and other tests administered in April of the school year, it is not uncommon to have both pre- and post-tests on less than 50% of the children enrolled in the program. Some children are there for pre-tests but leave before post-tests are given. Other children come too late for pre-tests but are there at the post-testing dates. Some children enter late and leave early and aren't there for either testing point. This is a very common pattern in the evaluation of migrant programs--test information presented that represents a very unsatisfactory percentage of the project group it is meant to evaluate.

Another problem encountered in use of calendar date testing with a migrant population results from their uneven attendance patterns. Of two children tested on the same date in April, it would not be at all uncommon for one to have attended 50 days total prior to that testing point, another child to have attended 90 days. This puts the evaluator in the position of comparing child progress between tests which represent two very different amounts of exposure to the program being evaluated.

By testing based on individual attendance records, each of the post-tests used in this evaluation represent a known amount of project intervention. At evaluation points the accumulated tests are then subgrouped by age and the period of attendance at the time of testing for purposes of analysis.

Selection of Tests

THE WIDE RANGE ACHIEVEMENT TEST

The IBI program selected the Wide Range Achievement Test to measure English reading, math, spelling at the upper age levels (in the follow-up study), and handwriting skills at the preschool level. One reason for its selection was to achieve comparability with published research from other programs serving similar populations. This test was one of two achievement tests used in the massive Follow Through studies conducted by the Office of

Education. It was also mandated in the State of Washington for a number of years as the achievement test to be used by all projects serving migrant children. On this basis it was felt that the instrument familiarity in other similar programs would make the findings more usable.

The preschool level of the spelling subtest was rated favorably by the Center for the Study of Evaluation as a measure of visual-motor coordination, in its report on tests for preschool and kindergarten. (See references, CSE 1971). The chief limitation of this subtest is a potential problem of consistency in scoring standards since a good deal of judgment is required in evaluating the marks. IBI has been fortunate in having one person handling processing of tests throughout the time this test has been in use. She rescores all tests submitted by individual testers, so the tests reported have a higher degree of consistency than would otherwise be the case if many people were using different standards in scoring.

The math subtest up to the third grade level relates entirely to mechanical arithmetic; i.e., there are no "story problems" where competency in the language used would make a major difference. Testers give instructions and encouragement while administering this test in either Spanish or English. Under these conditions there has been found to be no significant difference based on language dominance among the IBI children tested, and tests are therefore combined across language dominance groups for analysis. The test manual used has been the 1965 edition. (New norms were published in 1978, but since IBI is measuring longitudinal gains, a major effort has been made to keep the same instruments and same norming over the years. If, in the future, the new norms are used, all tests will be rescored back to 1973 to keep this consistency.) In the 1965 manual the reliability coefficient reported for this subtest for the age range used by IBI is .94.

The reading subtest of the WRAT is individually administered. This is an advantage with children for whom English is a second language as there is less likelihood that failure to understand the directions will be interpreted as lack of knowledge of the test items. It measures word attack and decoding skills, which makes it an appropriate test for a phonetic reading curriculum such as IBI is using. The reliability coefficient for the reading test reported in the test manual is over .98.

The greatest limitation of the reading test is that it does not include a measure of comprehension. Knowing if children are understanding what they read, particularly for reading in their second language, is important in a bilingual program. For a time the project added another reading test, the English version of the InterAmerican Test Series (IBI uses the series to test reading in

Spanish). However, this test was eventually abandoned because it fit so poorly with the curriculum IBI is using. The test is totally unrelated to a phonetic approach to the teaching of reading, and test items in the English version abound with irregular usages of letter sounds. IBI is trying out other tests now, and eventually hopes to have a more comprehensive measurement of children's reading skills. Meanwhile, the WRAT reading data provides useful information on one important aspect of reading skills and will continue to be used.

PEABODY PICTURE VOCABULARY TEST

Vocabulary in Spanish and in English is measured using the Peabody Picture Vocabulary Test. This test has two forms. Form A is used in English. Form B was adapted (rather than strictly translated) by the project for use in Spanish, attempting to keep the level of difficulty between the two forms the same. Like the Wide Range Achievement Test, this test was selected in part because it has been very widely used in educational research, particularly among poverty level children and in preschool programs. It was felt that use of this instrument would lend comparability to the project's findings.

It was also selected because it has among the highest ratings of tests for preschool and kindergarten children published by the Center for the Study of Evaluation (see References CSE 1971). And it was also specifically recommended for use in bilingual programs in A Handbook for Evaluation (see references Saville & Troike, 1971) published for the guidance of bilingual evaluators by two of the recognized leaders in the field of bilingual education.

Subsequently, there have been a number of specific attacks on this test based on allegations of cultural bias (see references Hickey, 1972; Matheny, 1971). These attacks hit particularly at interpretation of scores based on the published norms. The norms for this test do appear to be very distorted for linguistically different children. (To some extent this is true of all tests developed for the majority population in an English speaking nation.)

The method of analysis used in the IBI program, however, was designed so that all statistical comparisons are made between groups that come from the same sociocultural and linguistic group. This means that whatever cultural bias affects the test, it affects the test scores of all groups equally. All statistical analysis is also done using raw scores, since all conversions of scores ties the scoring in to the norming sample. The Peabody Picture Vocabulary Tests are used by the IBI program as an internal measure and as such have validity as a measure of comparative differences and change.

Longitudinal evaluation is only possible if the same instruments are retained over a period of years. So few bilingual programs have longitudinal data that the 9 years of test data accumulated by IBI is uniquely valuable. A great deal of test development has taken place in the past decade, particularly in the measurement of language competencies, and no doubt future evaluation and research in bilingual education will be greatly benefited by the greater array of suitable instruments. IBI is adding other instruments to obtain a broader test of the many skills that go into communicative competence in two languages. It will also continue to use the PPVT as a useful measure of one aspect of language competence.

THE COOPERATIVE PRESCHOOL INVENTORY

This test was specifically developed for a measurement of the effects of Head Start programs and was utilized in many evaluative efforts measuring the impact of this nation-wide program of preschool education. It is also one of the most frequently selected test instruments for research on preschool programs, so in using it IBI has gained comparability with other programs serving similar populations. The test is published in both English and in Spanish. IBI adapted the Spanish version to accommodate dialect differences of the children served. Using the test in whichever language the child is most proficient, IBI has found no significant differences in test results based on language dominance of the children in the program. Tests are therefore pooled across language dominance groups for analysis.

THE PRUEBA DE LECTURA SERIE INTERAMERICANA

This test is used for the measurement of Spanish reading. It was selected because there is more adequate information as to validity and reliability for it than for most other Spanish language tests, and it appears to be among the most widely used Spanish language test series among U.S. bilingual programs. For many years there were no published norms for this test. With the increased number of bilingual programs now teaching Spanish reading, norms have now been published. The norms are not scientifically derived being based simply on the test users who have chosen to send their tests for scoring to the publisher. In the IBI program, Level I is used for children in the first grade and Level II is used for children in second and third grade.

THE PICTORIAL TEST OF BILINGUALISM AND LANGUAGE DOMINANCE

This test was added to the IBI evaluation battery in 1978 to measure oral competence in Spanish and English. It was selected on the basis of having more reliability data than most other tests included in a review of oral language tests published by

Northwest Regional Educational Laboratory. (See references, Silverman et al., 1976). The limitations of this test are its rather narrow range (in their primary language many children are able to answer most items correctly by age 5, leaving little room to measure growth); the other limitation is that it is based on object identification, which doesn't measure knowledge of grammatical structures, fluency, or many other aspects of oral language facility.

THE BMHS TEST OF CULTURAL CONCEPTS

No published tests could be found which measured knowledge of culture in a way that seemed appropriate to the very young children (down to age three) served by the IBI program. Most of the tests of cultural content located related to social studies programs at the secondary level or higher. The project therefore developed its own test. This is a 44 item test; half the items using cues in Spanish and related to Mexican culture and half given in English and related to U.S. culture. The content covers six areas; clothing, foods, holidays, song or games, dances and national symbols. Split half reliability on the measure field tested with 70 children was .90.

The Evaluation Design

In order to judge whether children benefited from the program, it was necessary to have some reasonable basis for judging how the children would have progressed academically without benefit of the program. For this purpose, IBI used an adaptation of a "baseline model." In educational experimentation the "baseline model" usually involves obtaining test scores from children in a time period before a particular program is put in place, and then using these as the "baseline" for comparison to the test scores of the same or other children of comparable age or grade level who have been tested at some time after the new program is initiated. In the adaptation of this model used by IBI, all children coming into the IBI program are given pretests as soon as possible after they enter the program. Provided the pretest was given before the child had attended the program for 30 days (an arbitrary figure within which it was judged the effect of the program participation could be considered minimal), the test goes into a data bank as a baseline score for that age group.

Since children enroll in the IBI program at different ages over the entire range served by IBI, it has been possible over a period of years to accumulate a baseline group of scores for every age group. The "adaptation" this represents of the usual baseline evaluation model is that instead of all tests being taken in a time period before the program was started, the IBI baseline data bank is being added to each month as new tests are accumulated from children entering the program. The new child entering at age five has a pretest going into the baseline group for five year olds. Other children, who entered IBI at three or four, will have accumulated enough attendance for post testing at age five, and their score will be compared to the baseline group for age five.

Since IBI enrolls more children at the younger age levels, the baseline group was slow in accumulating for the school-age children. Therefore, a further adaptation was made in which tests were given among children at a neighboring school in south Texas, who met all the requirements of the IBI program for admission, and who represented the same ethnic group, socioeconomic status, migrant status, and linguistic environment as IBI children enrolled in south Texas. A statistical comparison of the scores of children from this comparison school and the baseline scores accumulated from pretests of children in the IBI program showed no significant differences in most cases; the few cases where there was a significant difference, the scores of children in the comparison school were higher. Adding these scores to the baseline group enlarged the number of children in what was then called the "baseline-comparison" group. The statistical comparison indicated that the children in the comparison school and IBI represented the same larger population of migrant children, and that the only effect of addition of scores from the comparison school to the baseline group would be to raise the level of scores of the baseline group, thereby making it a more rigorous test for the project to show a significant increase based on project attendance.

A cut-off date for testing is established for each evaluation. All tests to that date are then grouped by age and attendance categories. In the past, all goals have been written calling for a significant superiority of project children after 200 days (equivalent of one school year). The goals are still written in that way so that analysis is still done comparing the means for each attendance category with the mean of the baseline comparison group (called the "0 attendance" group on figures illustrating test results). A t-test is used between these pairs to establish statistical significance. Using t-tests between a series of paired groups establishes the time of attendance required for project children to establish a significant superiority, in keeping with the project goal of significant superiority by one year (or 200 days).

To increase the value of the progress data, a longitudinal dimension was added to the analysis this year. Tests were grouped into attendance categories the equivalent of 1/2 school year, 1 school year, 2 school years, and 3 or more school years. Tests were assigned to the category closest to the cumulative attendance at the time the test was given. In general, any subgroup with less than ten was considered too small for statistical analysis. However, it was nearly always possible to report two or more attendance categories for every age level, so the effects of the program over time could be seen.

For the extra analysis included in this report (special studies on the oral language instrument, on the comparison between North and South, and the follow-up study), where there were multiple attendance groups within an age category to be compared, analysis of variance was used to determine if attendance produced a significant effect. Two way analysis of variance was used when two variables were being examined, location and attendance.

All test data has been put on computer cards and the analysis is run using programs for t-tests, ANOVA, frequencies and breakdown included in the SPSS computer package (Version H).

As noted in the discussion of tests, to reduce the distortion that comes from using tests that were standardized with children quite different from the linguistic minority servied by this program, analysis has used raw scores. Significance has been determined by comparing groups at different attendance levels, all of whom come from the same linguistic background. However, in displaying the data, comparisons to the national norms (mostly reported as percentile ranks) allows the reader to see how project children compare to children of the linguistic majority, which adds some interpretative power to the data.

Outside Review of Project Findings

The IBI program has employed independent evaluation specialists who have re-examined all analysis procedures and validated claims. The evaluation division of Northwest Educational Research Laboratories in Portland performed this evaluation review and audit service for the program through 1974, and Technical Assistance Services of Seattle through 1978.

Project evaluations have been reviewed by the Joint Dissemination Review Panel of the U.S. Office of Education who verified that it had objectively established that it was producing significant educational gains for the children participating. As a nationally validated program (since 1973) it has been listed by the USOE in its directory of "educational Programs That Work." (The IBI program was originally called "Training Migrant Paraprofessionals in the Bilingual Mini Head Start", and its original validation is under that name. When the project became a national demonstration program, sending literature to other school districts who might want to adopt the model, USOE officials recommended a shorter, more manageable title--hence IBI.)

STATISTICAL DETAIL OF TEST ANALYSIS FOR INSTRUCTIONAL COMPONENT

1.1 PRESCHOOL CONCEPTS

TABLE 3. Cooperative Preschool Inventory Test Scores

Age and Attendance	Number	Mean Raw Score	St. Dev.	t-value	2-tail Prob.	Nat'l Percentile
Age 3.0-3.11						
0 Attendance	393	19.314	7.690	-	-	30th
1/2 year	112	24.866	6.838	6.61	0.000	53rd
1 year	16	29.875	6.386	5.38	0.000	69th
Age 4.0-4.11						
0 Attendance	161	29.695	10.842	-	-	35th
1/2 year	222	33.568	8.322	3.79	0.000	50th
1 year	142	36.916	8.585	6.46	0.000	60th
2+ years	88	41.398	8.840	9.20	0.000	73rd
Age 5.0-5.5						
0 Attendance	41	38.024	9.093	-	-	48th
1/2 year	54	43.777	9.749	2.93	0.004	69th
1 year	77	43.402	8.784	3.13	0.002	69th
2+ years	104	48.846	7.260	7.51	0.000	86th

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*t-test between post-test attendance group and the 0 attendance group of the same age

1.2 HANDWRITING

TABLE 4. Wide Range Achievement Test, Spelling Subtest Scores

Age and Attendance	Number	Mean	St. Dev.	t-value*	2-tail Prob.	National Percentile Rank**
Age 3.0-3.11						
0 Attendance	258	0.798	1.247	-	-	
1/2 year	117	2.444	1.923	8.49	0.000	
1 year	12	4.417	2.906	4.29	0.001	
Age 4.0-4.11						
0 Attendance	172	2.942	3.064	-	-	
1/2 year	227	5.515	4.082	7.19	0.000	
1 year	143	8.154	4.979	10.92	0.000	
2 years	62	10.484	4.493	12.23	0.000	
Age 5.0-5.11						
0 Attendance	128	8.039	4.946	-	-	7th
1/2 year	114	11.614	5.102	5.52	0.000	30th
1 year	119	13.437	5.055	8.47	0.000	37th
2 years	149	15.765	4.456	13.67	0.000	58th
3 years	31	16.548	2.681	13.08	0.000	66th

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*t-value represents t-test between post-test attendance group and the 0 attendance group of the same age

**National Percentile Rank only available for age 5.0 and above

1.3 SPANISH VOCABULARY

TABLE 5. Spanish Vocabulary Scores
Peabody Picture Vocabulary Test, Form A

(For Children Whose Primary Language is Spanish)

Age and Attendance	Number	Mean	St. Dev.	t-value*	2-tail Prob.
Age 3.0-3.11					
0 Attendance	312	19.099	8.261	-	-
1/2 year	115	25.278	8.812	6.73	0.000
1 year	14	27.571	6.688	3.78	0.000
Age 4.0-4.11					
0 Attendance	180	27.422	9.177	-	-
1 year	135	32.111	8.746	4.58	0.000
2 years	72	35.111	8.327	6.17	0.000
Age 5.0-5.11					
0 Attendance	124	36.952	9.386	-	-
1 year	104	38.760	8.311	1.53	0.128
2 years	148	40.372	8.193	3.21	0.001
3 years	37	40.351	7.072	2.37	0.020
Age 6.0-6.11					
0 Attendance	79	45.405	10.609	-	-
1 year	42	45.405	8.534	-0.00	1.000
2 years	68	45.912	8.711	0.31	0.755
3 years	55	47.236	7.729	1.16	0.250

Spanish Vocabulary Scores

(For Children Whose Primary Language is English)

Age 3.0-3.11					
0 Attendance	62	6.242	6.180	-	-
1/2 year	41	10.415	6.921	3.20	0.002
1 year	5	(too few for analysis)			
Age 4.0-4.11					
0 Attendance	63	7.984	9.960	-	-
1 year	35	14.229	9.635	3.01	0.003
2 years	21	15.143	8.923	2.92	0.004
Age 5.0-5.11					
0 Attendance	31	12.936	12.299	-	-
1 year	30	18.733	11.893	1.37	0.066
2 years	34	19.206	11.612	2.11	0.038
3 years	14	22.214	15.671	2.15	0.031
Age 6.0-6.11					
0 Attendance	15	18.933	16.837	-	-
1 year	11	29.727	18.331	1.56	0.133
2 years	15	23.400	14.667	0.77	0.445
3 years	9	23.333	16.248	0.63	0.537

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*t-test between the means of the post-test attendance group and the "0 attendance" group of the same age and language classification

1.4 ENGLISH VOCABULARY

TABLE 6. English Vocabulary Scores
Peabody Picture Vocabulary Test Scores, Form A
(For Children Whose Primary Language is Spanish)

Age and Attendance	Number	Mean	St. Dev.	t-value*	2-tail Prob.
Age 3.0-3.11					
0 Attendance	312	6.080	3.872	-	-
1/2 year	115	10.574	6.235	7.23	0.000
1 year	14	16.714	8.739	4.53	0.001
Age 4.0-4.11					
0 Attendance	180	9.511	6.866	-	-
1 year	135	15.963	9.640	6.62	0.000
2 years	72	25.597	13.441	9.66	0.000
Age 5.0-5.11					
0 Attendance	124	12.823	9.982	-	-
1 year	104	21.029	13.233	5.20	0.000
2 years	148	28.493	15.270	10.16	0.000
3 years	37	39.541	13.799	10.95	0.000
Age 6.0-6.11					
0 Attendance	79	17.975	12.242	-	-
1 year	42	31.191	15.372	5.16	0.000
2 years	68	36.000	13.833	8.38	0.000
3 years	55	45.418	12.879	12.50	0.000
Age 7.0-7.11					
0 Attendance	69	27.420	15.830	-	-
1 year	15	42.533	13.426	3.43	0.001
2 years	29	37.103	12.155	2.95	0.004
3 years	28	45.071	13.092	5.22	0.000
Age 8.0-8.11					
0 Attendance	48	33.854	16.282	-	-
1 year	(Too few for analysis)				
2 years	17	53.882	10.197	5.87	0.000
3 years	26	56.846	9.045	7.81	0.000

---

* t-test is between post-test attendance group and the "0 attendance" group of the same age

1.4 ENGLISH VOCABULARY

TABLE 7. English Vocabulary Scores
Peabody Picture Vocabulary Test, Form A

(For Children Whose Primary Language is English)

Age and Attendance	Number	Mean	St. Dev.	t-value*	2-tail Prob.
Age 3.0-3.11					
0 Attendance	62	16.742	8.545	-	-
1/2 year	41	23.781	9.549	3.90	0.000
1 year	5	(Too few for analysis)			
Age 4.0-4.11					
0 Attendance	63	33.810	13.096	-	-
1 year	35	35.743	10.356	0.75	0.454
2 years	21	38.810	12.327	1.54	0.128
Age 5.0-5.11					
0 Attendance	31	43.387	10.917	-	-
1 year	30	47.167	10.961	1.35	0.182
2 years	34	48.912	6.649	2.44	0.019
3 years	14	49.286	6.592	1.87	0.069
Age 6.0-6.11					
0 Attendance	15	49.667	9.803	-	-
1 year	11	52.364	8.594	0.73	0.473
2 years	15	57.133	5.927	2.52	0.018
3 years	9	(Too few for analysis)			

(TOO FEW FOR ANALYSIS FOR AGE 7.0 AND ABOVE)

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*t-test is between the means of the post-test attendance group and the "0 attendance" group of the same age

1.5 MATH SKILLS

TABLE 8. Math Subtest Scores, Wide Range Achievement Test

Age and Attendance	Number	Mean St. Score[*]	Nat'l. %ile[**]	Raw Sc. Mean	St. Dev.	t-value[*]	2-tail Prob.
Age 3.0-3.11							
0 Attendance	258	-	-	2.845	2.048	-	-
1/2 year	117	-	-	5.855	2.847	10.29	0.000
1 year	12	-	-	7.250	3.361	4.50	0.001
Age 4.0-4.11							
0 Attendance	172	-	-	4.645	2.941	-	-
1 year	143	-	-	9.797	3.514	13.94	0.000
2 years	62	-	-	11.419	3.578	14.65	0.000
Age 5.0-5.11							
0 Attendance	128	81.375	10th	9.062	4.173	-	-
1 year	119	100.454	50th	13.840	4.102	9.06	0.000
2 years	147	104.732	63rd	15.007	4.023	12.05	0.000
3 years	31	111.065	77th	16.839	3.513	9.58	0.000
Age 6.0-6.11							
0 Attendance	87	86.977	19th	13.529	4.710	-	-
1 year	45	101.267	53rd	17.711	5.341	4.62	0.000
2 years	66	107.076	68th	19.121	4.345	7.52	0.000
3 years	42	111.524	79th	21.167	3.060	11.05	0.000
Age 7.0-7.11							
0 Attendance	80	86.900	19th	19.100	4.851	-	-
1 year	20	98.600	47th	23.300	4.092	3.56	0.001
2 years	31	99.903	50th	28.871	3.384	5.86	0.000
3 years	21	103.429	58th	24.952	2.539	7.55	0.000
Age 8.0-8.11							
0 Attendance	55	87.200	19th	22.746	4.719	-	-
1 year	9	95.111	37th	26.222	1.481	4.32	0.000
2 years	18	96.777	42nd	27.333	2.058	5.73	0.000
3 years	14	100.429	50th	28.286	1.939	6.75	0.000

---

[*] t-test is between the means of the post-test attendance group and the "0 attendance" group of the same age.

[**] Standard Scores are based on a mean of 100 and a standard deviation of 15. Standard Scores and percentiles are only available for age 5 and over.

1.6 READING IN ENGLISH

TABLE 9. Reading Subtest, Wide Range Achievement Test Scores

(For Children Whose Primary Language is Spanish)

Age and Attendance	Number	Mean St. Score[**]	Nat'l. %ile[**]	Raw Sc. Mean	St. Dev.	t-value[*]	2-tail Prob.
Age 4.0-4.11							
0 Attendance	119	-	-	6.277	3.955	-	-
1 year	115	-	-	9.696	4.134	6.46	0.000
2 years	46	-	-	10.891	3.335	7.00	0.000
Age 5.0-5.11							
0 Attendance	98	79.551	9th	9.367	3.795	-	-
1 year	95	89.210	25th	13.084	5.396	5.52	0.000
2 years	121	95.397	37th	16.512	7.096	9.52	0.000
3 years	20	99.200	47th	18.950	5.853	7.03	0.000
Age 6.0-6.11							
0 Attendance	73	79.986	9th	14.274	7.404	-	-
1 year	39	89.205	23rd	19.795	8.523	3.56	0.001
2 years	56	97.107	42nd	24.464	10.662	6.11	0.000
3 years	36	98.333	45th	27.889	9.806	7.36	0.000
Age 7.0-7.11							
0 Attendance	67	79.209	8th	23.373	9.982	-	-
1 year	16	89.125	25th	33.000	13.206	3.25	0.002
2 years	29	90.483	25th	33.414	11.834	4.27	0.000
3 years	19	107.053	68th	46.421	14.183	6.63	0.000
Age 8.0-8.11							
0 Attendance	48	79.896	9th	31.187	11.808	-	-
1 year	9	89.444	23rd	43.111	4.859	5.07	0.000
2 years	15	99.067	47th	50.933	11.640	5.67	0.000
3 years	14	107.071	68th	56.857	7.774	7.64	0.000

---

[*] t-test is between means of post-test attendance group and the "0 attendance" group of the same age

[**] Standard Scores are based on mean of 100 and standard deviation of 15. Standard Scores and percentiles are only published for age 5 and over.

1.6 READING IN ENGLISH

TABLE 10. Reading Subtest, Wide Range Achievement Test Scores

(For Children Whose Primary Language is English)

Age and Attendance	Number	St. Score[**]	Nat'l. %ile[**]	Raw Sc. Mean	St. Dev.	t-value[*]	2-tail Prob.
Age 4.0-4.11							
0 Attendance	37	-	-	7.622	3.996	-	-
1 year	28	-	-	10.357	3.070	3.01	0.004
2 years	16	-	-	13.063	6.475	3.11	0.005
Age 5.0-5.11							
0 Attendance	22	89.909	25th	13.909	6.838	-	-
1 year	24	98.792	47th	18.417	6.514	2.29	0.027
2 years	27	95.333	37th	15.926	5.540	1.14	0.260
3 years	11	97.273	42nd	17.636	6.038	1.53	0.136
Age 6.0-6.11							
0 Attendance	10	97.300	42nd	24.300	13.317	-	-
1 year	6	(Too few for analysis)					
2 years	10	104.500	63rd	29.200	9.636	0.94	0.358
3 years	6	(Too few for analysis)					

(THERE ARE TOO FEW FOR ANALYSIS AT AGE 7 AND ABOVE.)

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[*] t-tests are between the means of the post-test attendance group and the "0 attendance" group of the same age.

[**] Standard Scores are based on a mean of 100 and standard deviation of 15. Standard Scores and percentiles are only available for age 5 and over.

1.9 READING IN SPANISH

TABLE 11. Prueba de Lectura, Serie Interamericana Voloraciónes

(Scores on Reading Test, Inter-American Series)

Grade Level and Test Group	Number	Mean Raw Score	St. Dev.	t-value*	2-tail Prob.	Nat'l. %ile*
FIRST GRADE						
Comparison	15	22.067	6.341	-	-	19th
IBI Bilingual	32	32.875	15.364	3.41	0.001	45th
SECOND GRADE						
Comparison	15	27.733	7.667	-	-	16th
IBI Bilingual	10*	39.900	10.785	3.31	0.003	41st
THIRD GRADE						
Comparison	17	34.941	9.884	-	-	20th
IBI Bilingual	16	47.375	14.655	2.87	0.007	38th

---

*Notes on Analysis:

The t-test is between the means of the IBI Bilingual and the comparison group of the same grade level.

National Percentile scores are norms published for post-test scores in May; however, these tests were given in February because families begin migration in March.

At second grade owing to testing error, some tests were given using Level I and some using Level II. Only the tests using Level II have been used for this analysis. Third grade scores are also based on Level II.

1.8 CULTURAL CONCEPTS

TABLE 12. Scores on BMHS Test of Cultural Concepts

Age and Attendance	Number	Mean Raw Score	St. Dev.	t-value	2-tail Prob.
Age 4					
0 Attendance	69	21.217	4.684	-	-
1 year+	76	26.842	4.716	7.20	0.000
Age 5					
0 Attendance	38	25.658	5.169	-	-
1 year+	144	31.833	4.971	6.76	0.000
Age 6					
0 Attendance	10	26.700	6.929	-	-
1 year+	68	35.647	4.567	3.96	0.003
Age 7					
0 Attendance	10	29.600	6.995	-	-
1 year+	32	35.250	4.000	2.43	0.033

Notes on Analysis:

This analysis includes tests through April, 1979. Because of cuts in the testing budget, testing was temporarily suspended in this area.

The t-value is based on a comparison of the means of the 1 year+ attendance group and the "0 attendance" group at each age level.

The BMHS Test of Cultural Concepts is a 44 item test developed for the IBI program.

1.9 SPECIAL STUDY: COMPARING IBI MOBILE GROUP AND COMPARISON GROUP

TABLE 13. Math Scores, From Wide Range Achievement Test for IBI Mobile and Comparison Group*

Grade Level and Test Group	Number	Mean Raw Score	St. Dev.	t-value**	2-tail Prob.
KINDERGARTEN					
Comparison	31	8.548	4.280	-	-
IBI Mobile	28	16.464	3.892	7.40	0.000
FIRST GRADE					
Comparison	30	15.000	3.869	-	-
IBI Mobile	31	23.161	3.698	8.42	0.000
SECOND GRADE					
Comparison	50	21.700	4.652	-	-
IBI Mobile	29	25.035	3.041	3.85	0.000
THIRD GRADE					
Comparison	40	24.225	4.117	-	-
IBI Mobile	31	28.452	1.786	5.82	0.000

Notes on Analysis:

*The comparison group are children from a neighboring south Texas school district whose families move during the year to do seasonal farm work. The IBI mobile group were part of the mobile component at the Texas site, children served both in Texas and in one or more locations in the north by mobile teachers who moved with them.

**The t-test compares the means of the IBI mobile group and the comparison group of the same grade level.

1.9 SPECIAL STUDY: COMPARING IBI MOBILE GROUP AND COMPARISON GROUP

TABLE 14. Reading Scores in English, from Wide Range Achievement Test for IBI Mobile and Comparison Group*

Grade Level and Test Group	Number	Mean Raw Score	St. Dev.	t-value**	2-tail Prob.
KINDERGARTEN					
Comparison	31	9.581	4.031	-	-
IBI Mobile	28	16.750	7.326	4.59	0.000
FIRST GRADE					
Comparison	30	18.267	6.313	-	-
IBI Mobile	31	28.161	10.106	4.60	0.000
SECOND GRADE					
Comparison	50	26.160	9.968	-	-
IBI Mobile	29	41.793	14.686	5.09	0.000
THIRD GRADE					
Comparison	40	32.300	12.980	-	-
IBI Mobile	31	52.871	8.804	7.94	0.000

Notes on Analysis:

*The comparison group are children from a neighboring south Texas school district whose families move during the year to do seasonal farm work. The IBI mobile group were part of the mobile component at the Texas site, children served both in Texas and in one or more locations in the north by mobile teachers who moved with them.

**The t-test compares the means of the IBI mobile group and the comparison group of the same grade level.

1.9 SPECIAL STUDY: COMPARING IBI MOBILE GROUP AND COMPARISON GROUP*

TABLE 15. Spanish Vocabulary Scores, from Form B (translation) of Peabody Picture Vocabulary Test

Grade Level and Test Group	Number	Mean Raw Score	St. Dev.	t-value**	2-tail Prob.
KINDERGARTEN					
Comparison	31	40.000	9.839	-	-
IBI Mobile	28	42.750	7.311	1.21	0.232
FIRST GRADE					
Comparison	30	48.667	10.001	-	-
IBI Mobile	31	50.290	7.909	0.70	0.484
SECOND GRADE					
Comparison	50	54.320	10.748	-	-
IBI Mobile	29	55.138	10.759	0.33	0.745
THIRD GRADE					
Comparison	40	56.550	13.651	-	-
IBI Mobile	31	59.161	9.940	0.90	0.373

Notes on Analysis:

*The comparison group are children from a neighboring south Texas school district whose families move during the year to do seasonal farm work. The IBI mobile group were part of the mobile component at the Texas site, children served both in Texas and in one or more locations in the north by mobile teachers who moved with them.

**The t-test compares the means of the IBI mobile group and the comparison group of the same grade level.

1.9 SPECIAL STUDY: COMPARING IBI MOBILE GROUP AND COMPARISON GROUP[*]

TABLE 16. English Vocabulary Scores, from Form A of Peabody Picture Vocabulary Test

Grade Level and Test Group	Number	Mean Raw Score	St. Dev.	t-value[**]	2-tail Prob.
KINDERGARTEN					
Comparison	31	12.032	7.190	-	-
IBI Mobile	28	21.786	10.236	4.27	0.000
FIRST GRADE					
Comparison	30	20.100	13.827	-	-
IBI Mobile	31	36.194	12.297	4.81	0.000
SECOND GRADE					
Comparison	50	30.020	16.402	-	-
IBI Mobile	29	43.966	14.121	3.83	0.000
THIRD GRADE					
Comparison	40	35.875	15.693	-	-
IBI Mobile	31	55.387	7.749	6.86	0.000

Notes on Analysis:

[*] The comparison group are children from a neighboring south Texas school district whose families move during the year to do seasonal farm work. The IBI mobile group were part of the mobile component at the Texas site, children served both in Texas and in one or more locations in the north by mobile teachers who moved with them.

[**] The t-test compares the means of the IBI mobile group and the comparison group of the same grade level.

SPECIAL STUDY: ORAL LANGUAGE TEST SCORES

TABLE 17. Scores from Pictorial Test of Bilingualism and Language Dominance

Age and Attendance	Number	English Score		Spanish Score		Biling. Score		Total Score	
		Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev
Age 3.0-3.11									
0 Attendance	23	3.087	4.389	23.565	6.096	1.957	2.915	24.739	4.779
1/2 year	18	5.667	5.911	25.556	3.650	5.056	5.651	26.167	3.519
Age 4.0-4.11									
0 Attendance	17	6.588	8.464	27.765	5.044	4.529	5.938	28.059	4.943
1 year	37	14.135	6.779	28.676	4.679	12.892	6.059	29.919	3.004
2 years	16	20.875	7.089	28.188	5.357	18.063	6.104	31.000	2.828
ge 5.0-5.11									
0 Attendance	4	(Too few for analysis)							
1 year	31	16.194	7.245	31.742	4.274	15.258	7.039	32.677	3.390
2 years	49	20.959	6.586	31.735	4.438	19.490	6.083	33.204	2.761
3 years	-	(Too few for analysis)							
ge 6.0-6.11									
0 Attendance	4	(Too few for analysis)							
1 year	2	(Too few for analysis)							
2 years	18	26.333	6.278	31.389	4.984	23.389	6.232	34.333	2.590
3 years	15	31.133	4.719	33.067	3.845	27.733	3.991	36.467	2.200

(TOO FEW FOR ANALYSIS AT OLDER AGES)

nalysis of ariance for ain Effects:	ENGLISH SCORES	SPANISH SCORES	BILINGUAL SCORES	TOTAL SCORES
AGE:	df=5 $F= 9.631^{**}$	df=5 $F=12.842^{**}$	df=5 $F=13.482^{**}$	df=5 $F=17.149^{**}$
TTENDANCE:	df=4 $F=42.297^{**}$	df=4 $F= 1.582^{ns}$	df=4 $F=42.468^{**}$	df=4 $F= 7.759^{**}$

$^{**}p < .01$, difference significant at .01 level

ns = $p > .05$, difference not significant

SPECIAL STUDY: Comparing Test Scores of Children Enrolled in the North and Those Enrolled in the South

TABLE 18. ENGLISH VOCABULARY
(From Peabody Picture Vocabulary Test, Form A)

	NORTH			TEXAS			Analysis of Variance for Main Effects:
ge & Time ttended	Number	Mean Raw Score	St. Dev.	Number	Mean Raw Score	St. Dev.	
ge 4.0-4.11							LOCATION
Attendance	58	10.603	7.849	122	8.992	6.315	F = 111.824**
year	64	21.109	10.523	71	11.324	5.674	TIME ATTENDED
years	50	31.160	12.141	22	12.955	5.075	F = 37.449**
ge 5.0-5.11							
Attendance	35	14.143	11.655	89	12.303	9.264	LOCATION
year	41	30.902	13.503	63	14.603	8.177	F = 234.917**
years	72	40.514	9.837	76	17.105	9.762	TIME ATTENDED
years	28	44.536	10.355	9	24.000	11.662	F = 36.708**
ge 6.0-6.11							
Attendance	20	19.050	14.077	59	17.610	11.666	LOCATION
year	17	42.882	9.539	25	23.240	13.430	F = 81.619**
years	27	46.296	6.905	41	29.220	13.070	TIME ATTENDED
years	31	54.097	5.075	24	34.208	11.100	F - 37.999**
ge 7.0-7.11							
Attendance	11	20.273	15.818	58	28.776	15.599	LOCATION
year	7	46.000	16.120	8	39.500	10.731	F = 0.783ns
years	5	43.400	17.572	24	35.792	10.758	TIME ATTENDED
years	9	54.444	4.035	19	40.632	13.606	F = 8.471**
ge 8.0-8.11							
Attendance	6	28.833	20.518	42	34.571	15.759	LOCATION
year	3	44.333	24.434	0	-	-	F = 1.109ns
years	7	60.429	6.451	10	49.300	10.023	TIME ATTENDED
years	4	65.750	4.500	22	55.227	8.956	F = 14.213**

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* $p < .01$, statistically significant differences at .01 level

ns = not statistically significant

SPECIAL STUDY: Comparing Test Scores of Children Enrolled in the North and Those Enrolled in the South

TABLE 19. SPANISH VOCABULARY
(From Peabody Picture Vocabulary Test, Form B)

ge & Time ttended	NORTH Number	NORTH Mean Raw Score	NORTH St. Dev.	TEXAS Number	TEXAS Mean Raw Score	TEXAS St. Dev.	Analysis of Variance for Main Effects:
ge 4.0-4.11							LOCATION
Attendance	58	25.500	9.104	122	28.336	9.106	$F = 27.815^{**}$
year	64	29.000	9.713	71	34.916	6.684	TIME ATTENDED
years	50	33.460	8.818	22	38.864	5.634	$F = 15.702^{**}$
ge 5.0-5.11							
Attendance	35	35.314	9.308	89	37.596	9.390	LOCATION
year	41	37.805	8.761	63	39.381	8.015	$F = 5.129^{*}$
years	72	39.250	8.876	76	41.434	7.391	TIME ATTENDED
years	28	39.893	7.026	9	41.778	7.446	$F = 4.244^{**}$
ge 6.0-6.11							
Attendance	20	39.850	11.926	59	47.288	9.514	LOCATION
year	17	44.706	11.084	25	45.880	6.476	$F = 12.108^{**}$
years	27	42.370	8.063	41	48.244	8.414	TIME ATTENDED
years	31	47.387	7.684	24	47.042	7.948	$F = 1.343^{ns}$
ge 7.0-7.11							
Attendance	11	46.909	12.550	58	51.414	10.268	LOCATION
year	7	49.571	6.477	8	55.125	5.384	$F = 5.327^{*}$
years	5	46.400	8.961	24	52.000	10.509	TIME ATTENDED
years	9	52.333	7.036	19	56.579	11.663	$F = 1.612^{ns}$
ge 8.0-8.11							
Attendance	6	53.667	10.652	42	55.405	13.393	LOCATION
year	3	55.000	15.716	0	-	-	$F = 0.056^{ns}$
years	7	55.000	11.648	10	54.700	9.878	TIME ATTENDED
years	4	56.000	8.327	22	56.546	7.824	$F = 0.291^{ns}$

$< .05$ $^{**}p < .01$, statistically significant difference

s = not statistically significant

SPECIAL STUDY: Comparison of Children Enrolled in IBI in the North and in the South

TABLE 20. TEST DOMINANCE OF CHILDREN WHOSE FIRST LANGUAGE IS SPANISH AFTER DIFFERENT PERIODS OF ATTENDANCE

Location and Attendance Group	Children Who Test Highest in English Vocabulary on Post-Tests	Total Tested Classified Primary Language Spanish on Pre-Tests	Percentage Who Have Changed Test Dominance to English
AFTER 1 YEAR			
NORTH	48	144	33%
SOUTH	3	171	2%
AFTER 2 YEARS			
NORTH	98	164	60%
SOUTH	12	177	7%
AFTER 3 YEARS			
NORTH	54	77	70%
SOUTH	23	83	28%

SPECIAL STUDY: Comparing Test Scores of Children Enrolled in the North and Those Enrolled in the South

TABLE 21. MATH SCORES
(From Wide Range Achievement Test)

ge & Time ttended	Number	Mean Raw Score	St. Dev.	Number	Mean Raw Score	St. Dev.	Analysis of Variance for Main Effects:
ge 5.0-5.11							
Attendance	29	7.655	3.696	75	9.107	4.196	LOCATION
year	39	12.564	4.524	56	13.911	3.810	F = 5.148*
years	59	14.458	4.419	62	15.758	3.831	TIME ATTENDED
years	18	17.500	3.330	2	19.000	4.243	F = 43.546**
ge 6.0-6.11							
Attendance	18	12.278	4.848	57	13.404	4.358	LOCATION
year	19	17.737	4.433	20	19.050	5.306	F = 7.221**
years	24	18.500	3.310	32	19.750	4.919	TIME ATTENDED
years	24	21.333	2.371	12	22.083	4.100	F = 30.508**
ge 7.0-7.11							
Attendance	9	16.556	4.558	60	19.333	5.065	LOCATION
year	5	20.000	5.362	11	24.000	3.131	F = 8.863**
years	6	20.500	3.391	23	24.739	3.018	TIME ATTENDED
years	8	24.500	2.564	11	25.546	1.809	F = 14.764**
ge 8.0-8.11							
Attendance	7	18.000	5.132	42	23.762	4.143	LOCATION
year	4	25.500	1.291	5	26.800	1.483	F = 11.364**
years	2	26.000	2.828	13	27.846	1.951	TIME ATTENDED
years	3	27.667	0.577	11	28.455	2.162	F = 10.455**

$p < .05$ $^{**}p < .01$, differences between groups are statistically significant

SPECIAL STUDY: Comparing Test Scores of Children Enrolled in the North and Those Enrolled in the South

TABLE 22. READING IN ENGLISH
(From Wide Range Achievement Test)

	NORTH			TEXAS			
ge & Time ttended	Number	Mean Raw Score	St. Dev.	Number	Mean Raw Score	St. Dev.	Analysis of Variance for Main Effects:
ge 5.0-5.11							
Attendance	27	10.407	3.693	71	8.972	3.783	LOCATION
year	39	13.436	5.735	56	12.839	5.187	F = 0.545^{ns}
years	59	15.763	6.816	62	17.226	7.336	TIME ATTENDED
years	18	19.056	6.092	2	18.000	4.243	F = 27.734**
ge 6.0-6.11							
Attendance	17	15.000	12.268	56	14.054	5.269	LOCATION
year	19	20.421	8.591	20	19.200	8.637	F = 0.262^{ns}
years	24	23.083	8.246	32	25.500	12.192	TIME ATTENDED
years	24	28.792	9.833	12	26.083	9.922	F = 18.184**
ge 7.0-7.11							
Attendance	8	22.250	12.725	59	23.523	9.676	LOCATION
year	5	35.600	20.132	11	31.818	9.724	F = 0.188^{ns}
years	6	33.333	11.639	23	33.435	12.142	TIME ATTENDED
years	8	47.125	12.552	11	45.909	15.846	F = 13.340**
ge 8.0-8.11							
Attendance	7	27.143	13.146	41	31.878	11.600	LOCATION
year	4	43.000	5.099	5	43.200	5.263	F = 0.541^{ns}
years	2	57.500	10.607	13	49.923	11.850	TIME ATTENDED
years	3	56.667	2.082	11	56.909	8.814	F = 21.904**

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*p $<$ .01, differences are statistically significant

s = differences are not statistically significant

TABLE 23. COMPARISON OF TEST SCORES BETWEEN IBI FOLLOW-UP GROUP AND COMPARISON GROUP USING THE PEABODY PICTURE VOCABULARY TEST AND THE WIDE RANGE ACHIEVEMENT TEST

	IBI FOLLOW-UP			COMPARISON				
rade Level Test	Number	Mean Raw Score	St. Dev.	Number	Mean Raw Score	St. Dev.	t-value	2-tail Prob.
TH GRADE								
Spanish Voc.	11	66.455	17.443	15	57.667	9.271	1.52	0.151
English Voc.	11	63.545	12.581	15	48.867	13.010	2.88	0.008
Math	11	30.636	2.335	15	29.067	8.250	0.70	0.494
Reading	11	57.818	8.183	15	43.067	14.782	2.98	0.006
Spelling	11	36.091	5.147	15	28.400	9.226	2.49	0.020
TH GRADE								
Spanish Voc.	9	71.889	10.265	16	64.500	10.218	1.73	0.097
English Voc.	9	74.000	23.076	16	50.688	11.768	2.83	0.018
Math	9	34.000	3.969	16	33.125	2.062	0.62	0.551
Reading	9	68.667	11.214	16	58.250	8.660	2.60	0.016
Spelling	9	44.556	6.405	16	37.250	4.726	3.27	0.003
TH GRADE								
Spanish Voc.	10	74.800	9.102	16	70.625	11.701	0.96	0.347
English Voc.	10	69.700	7.587	16	66.813	16.183	0.61	0.545
Math	10	35.400	2.547	16	32.375	8.899	1.28	0.216
Reading	10	69.300	9.900	16	51.250	17.133	3.40	0.002
Spelling	10	42.600	4.695	16	34.500	11.027	2.59	0.017

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